COPYRIGHT PROTECTION FOR COMPUTER SOFTWARE TO ENHANCE TECHNOLOGY TRANSFER

HEARING

BEFORE THE

SUBCOMMITTEE ON
TECHNOLOGY AND COMPETITIVENESS

OF THE

COMMITTEE ON
SCIENCE, SPACE, AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

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COPYRIGHT PROTECTION FOR COMPUTER SOFTWARE TO ENHANCE TECHNOLOGY TRANSFER

THURSDAY, JULY 18, 1991

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
SUBCOMMITTEE ON TECHNOLOGY AND COMPETITIVENESS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:43 a.m. in room 2325, Rayburn House Office Building, Hon. Tim Valentine [chairman of the subcommittee] presiding.

Mr. VALENTINE. We'll get started. I apologize for being a few minutes late. I do try to start these meetings on time, but certainly other members of the subcommittee will understand the problems that one encounters when you start out the door in order to be here on time and you receive a phone call from a newspaper in a county that will be in one's district.

[Laughter.]

Mr. VALENTINE. You can't just say I'll see you later. Some things take priority.

I welcome all of you here. I will have an opening statement and I will recognize others and yield the chair to our colleague, the distinguished member of this committee for his previous service and who has rejoined us, the gentleman from Arkansas, Mr. Ray Thornton.

Computer software is one industry where the United States has maintained a technological lead and a favorable balance of trade. Furthermore, there is much computer software that is developed in our national laboratories that may have commercial potential. Little has been done to make such software marketable, however, since Federal copyright law prohibits the copyrighting of works created by Federal employees, including software.

Without such a protection, there is little incentive for industry to invest the time and capital necessary to modify the software for commercial markets. In fact, the unavailability of Federal copyrights is routinely noted as the biggest roadblock to private industry becoming more involved with our national laboratories.

Today we are especially going to examine the advisability of providing copyright protection to software. Our colleague, Mrs. Morella, the distinguished member of this body from the State of Maryland, has proposed at least a partial solution by drafting legislation that would provide such protection in the context of cooperative research and development agreements, or CRADAs.

We are interested in whether our panelists would limit Federal copyright to CRADAs, or would extend copyright protection to other classes of Federal software, or would do neither. In addition, there are other questions concerning protection of computer software that are being debated by experts in the fields of computer software and information law that we hope to touch upon.

These questions, briefly stated, include the following: what is the best means of protecting software, through the use of patents, or copyright, or by some other means; in protecting software, should a distinction be made on the complexity of the software; should Federal software be protected, or should it remain available for public dissemination; should the protection of Federal software be limited to software developed within the context of a CRADA, if not, how far should the Federal copyright be extended; how much of the software developed by the laboratories actually has commercial potential, and would this commercialization increase the use of the software by the private sector.

We have with us today a distinguished group of individuals representing Government and the software industry who are familiar with these problems, the questions which have been raised, and who have all the answers and all the solutions to tell us just which ones we should select from. We look forward to that testimony in the expectation that we will all be enlightened.

[The prepared statement of Mr. Valentine follows:]

OPENING STATEMENT OF THE
HONORABLE TIM VALENTINE (D-NC)
HEARING ON
COPYRIGHT PROTECTION FOR
FEDERALLY DEVELOPED COMPUTER SOFTWARE

July 18, 1991

Computer software is one industry where the United States has maintained a technological lead and a favorable balance of trade. Furthermore, there is much computer software that is developed in our national laboratories that may have commercial potential. Little has been done to make such software marketable, however, since federal copyright law prohibits the copyrighting of works created by federal employees, including software. Without such protection, there is little incentive for industry to invest the time and capital necessary to modify the software for commercial markets. In fact, the unavailability of federal copyrights is routinely noted as the biggest roadblock to private industry becoming more involved with our national laboratories.

Today, we specifically are going to examine the advisability of providing copyright protection to software. Our colleague, Mrs. Morella, has proposed at least a partial solution by drafting legislation that would provide such protection in the context of cooperative research and development agreements or CRADAs. We are interested in whether our panelists would limit federal copyrights to CRADAs or would extend copyright protection to other classes of federal software.

In addition, there are other questions concerning the protection of computer software that are being debated by experts in the fields of computer software and information law that we hope to touch upon. These questions include:

What is the best means of protecting software: through the use of patents or copyright or by some other means?

In protecting software, should a distinction be made on the complexity of the software?

Should federal software be protected or should it remain available for public dissemination?

Should the protection of federal software be limited to software developed within the context of a CRADA? If not, how far should federal copyright be extended?

How much of the software developed by the laboratories actually has commercial potential and would this commercialization increase use of the software by the private sector?

We have with us today a number of individuals representing government and the software industry who are familiar with the problems raised by these questions. We look forward to their testimony with the expectation that we will be able to develop some realistic options for transferring one of our most valuable government resources to the private sector.

Mr. VALENTINE. I am happy to recognize at this time the distinguished member of this subcommittee, whom I have already referred to, and welcome her here today to take the place as service ranking member, the lady from Maryland, Connie Morella.

Mrs. MORELLA. Thank you very much, Mr. Chairman.

I want to thank you and the ranking member, Mr. Lewis, who isn't here today, whose chair I am sitting in next to you, Mr. Chairman, actually for holding this morning's hearing, which I believe is very important. I know other members of the committee and people testifying do also.

Throughout the 102nd Congress, this subcommittee has been reviewing the ability of United States businesses to compete internationally. And as a result, we have been striving to strengthen the links between our Nation's technology base and our industry.

One such method is to enhance industry's access to federally funded technology through technology transfer from our Federal laboratories. Towards that goal, I introduced, as you know, H.R. 191, the Technology Transfer Act of 1991, at the beginning of the 102nd Congress. This bill is identical to H.R. 5850, which I introduced in the past Congress.

This legislation would enhance—would increase the transfer of technology for works prepared under certain cooperative research and development agreements—CRADAs— between Government-owned and Government-operated laboratories with private sector firms and other associated parties.

H.R. 191, which amends the Stevenson-Wydler Technology Innovation Act of 1980, would authorize agencies with the power to secure copyrights on behalf of the United States as author or proprietor in any computer software prepared in whole or in part by Government employees in the course of their work under a CRADA. The bill would also provide royalties for Federal employee authors of computer software by replicating the royalty provisions of the Federal Technology Transfer Act of 1986, which currently only applies to Federal employee inventors and patents.

Currently, copyright protection is not available for any works of the United States Government, and therefore Federal employees are not able to obtain copyright protection for their works created in the course of their official duties. Consequently, the incentives of proprietary rights and royalty sharing, so vital in the case of inventions, cannot be used to spur the development and commercialization of computer software in Federal laboratories.

H.R. 191, I believe, will have a major impact in the effort to commercialize computer software and develop our international competitiveness. For the Government unencumbered by the concern that their work may fall into the public domain, private funds will more freely enter into CRADAs with the Government. Additionally, with an incentive to develop commercially viable software under such agreements, the morale and creativity of Federal employees will be greatly enhanced.

Without an appropriate policy dealing with the commercialization of federally developed computer software, the prospects for its development and commercialization are limited. Merely making software available without proprietary protection is insufficient to ensure its effective commercialization.

Today's software is complex. It contains thousands of code lines and is practically useless to business unless they're willing to make substantial investments of time and money. For software to be commercially valuable, it has to be debugged, simplified, and training materials must be written and supplied. Without a proprietary interest, a firm could not be assured of recouping the necessary investment in such services.

During our subcommittee hearing on May 30th of this year regarding technology transfer and Federal laboratories, witnesses from the Department of Commerce, the U.S. Office of Naval Technology, the National Institutes of Health, the Department of Energy, and the Department of Agriculture testified that the Department's lack of ability to copyright software poses significant difficulties to what would otherwise be a very attractive product transfer.

There is a strong belief that H.R. 191 is necessary, but I understand that there also is some concern that the copyrighting of Federal software may impede public access to currently available software. I believe we can ultimately balance that concern with the vital need to transfer the work of our Federal laboratories, one of our most valuable Government resources, to the private sector.

I am looking forward to hearing from our witnesses today. I have had an opportunity to look at some of the testimonies. We do have a broad representation for our panels from the Administration, academia, industry associates, and the Copyright Office. I certainly welcome the suggestions of those who are testifying and the comments on how we can improve H.R. 191.

I strongly believe the continued cooperation of the private sector, coupled with the greater incentives in our Federal laboratories, will ultimately work to the benefit of all Americans in our Nation's economy. I look forward to working with our subcommittee chairman for the day, Mr. Thornton, and other members of this subcommittee, to enact H.R. 191.

Thank you, Mr. Chairman. Again, I look forward to hearing from our very prominent witnesses.

Mr. THORNTON. [Assuming chair.] Thank you, Mrs. Morella. Let me congratulate you for the leadership that you have demonstrated in addressing this most important area of legislative initiative. I do look forward to working with you and I'm sure other members of this committee join in appreciating your work.

I would like to make just a couple of comments before recognizing other members of the committee for their preliminary comments.

I have a tendency, as a retread, to look at history as we begin these hearings. But I want to assure you that I was not around when the beginning work started on patents and proprietary information.

It is remarkable, indeed, that in the very short and concise document which has been the foundation for our Government for over 200 years, that the authors of the Constitution of the United States thought it important enough to insert in Article I, Section 8-8 of the Constitution that, "The Congress shall have power to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respec-

tive writings and discovery [sic]," and by so saying recognized and set this country on a course that the best way to have full open disclosure of ideas and inventions was to allow those rights to be protected for a period of time, a real and radical departure from the trade secret concept in which inventions were tightly held and not disclosed so that the owner or inventor could achieve an economic advantage from being the only person who knew of that material.

We have, on occasion, failed to recognize how important disclosure of inventions is and how much of a main spring this constitutional provision, as implemented by Congress, becomes in moving the genius of our researchers into the marketplace.

A few years ago, sitting right where Secretary White was, a remarkable individual named Jacob Rabenow was testifying on the Uniform Patent Act which Betsy Anchor Johnson and I had drawn and had under consideration that led to the Bayh-Dole Act and other elements to the Stevenson-Wydler Technology Transfer Act. Dr. Rabenow was the holder of 200 inventions, a remarkable gentleman. He was talking about the 20,000 patents held publicly in the United States.

Dr. Rabenow said, "You show me a public patent which belongs to no one, and I will show you a nice document tied up in a blue ribbon, but economically it is a piece of junk because that which is equally available to everyone is worth nothing to anyone."

I could go ahead with another anecdote in which I asked Dr. Rabenow about some of his inventions and he told me he had invented a reading machine. I said, "A reading machine?"

He said, "Yes, I have invented a machine that reads 200 pages a minute."

I said, "We could use that in Congress."

He said, "It doesn't understand a thing it reads."

[Laughter.]

Mr. THORNTON. I refrained from saying that it would fit right in.

[Laughter.]

Mr. THORNTON. The volume of information and data that we are confronted with is extraordinary.

But the opportunity we have today to address whether we need to add to our economic competitiveness the springboard of making it possible for certain inventions which are copyrightable to be protected for a period of time is, I believe, as vital today as the question of the uniform patent policy was those 10 or 12 years ago.

According to senior officials at six Federal agencies, copyrighting, licensing, and royalty sharing authorities will stimulate the transfer and use of Federal software with commercial application by providing businesses protection for the investment of their resources and by providing Federal researchers with an incentive to further develop and document the software.

Mr. White, we are very delighted to have you with us today. I do want to recognize other members of the committee who are here for any preliminary or opening statements that they might wish to make.

The gentleman from Michigan, Mr. Henry?

Mr. HENRY. Thank you, Mr. Chairman. I have just two or three very brief comments.

I think we are all agreed as to what the problem is. The problem is how to develop an environment in which we ensure the commercial viability and stimulate scientific and commercial use of Government laboratory research. That's the problem.

There are three issues, however, that we're going to have to deal with, and that we have been dealing with for several years—and I commend the gentlelady and the chairman who have been involved in this—one is the philosophical dilemmas that historically we have said that Government funded research is owned by the public, so we always have to tread very carefully when we violate that reason, issues in terms of access to information, and ownership. And that's the broad panorama of concern.

Then we have the question as to whether or not the proposed solution works by way of in fact stimulating commercial viability. And thirdly, some very, very technical issues as to what ought to be in or out once we've resolved that problem.

As you know, we have come very, very close in the last couple of Congress', particularly, if I'm not mistaken, with the Department of Defense legislation last year that was pulled out at the last minute.

So I appreciate your ongoing interest in this and welcome Dr. White as our first witness.

Thank you very much, Mr. Chairman.

Mr. THORNTON. Thank you, Mr. Henry.

And it is a delight to have on this committee, and one of the bright new members of our Congress who is already making a tremendous contribution in this field, the gentleman from Indiana, Mr. Tim Roemer.

Mr. ROEMER. Thank you, Mr. Chairman, and thank you for your leadership, not just this morning but in many of the proposals that you are articulating on the floor of Congress and to both the Republican and the Democratic party with the Marshall Plan.

I think one of the reasons we're here this morning, too—I'm reading—our distinguished chairman this morning sites history—I'm reading an exciting book by Daniel Bernstein called "The Discoverers". It's a book about stimulating the creative genius in people. We need to see it now and not just read about it in history.

I think Mrs. Morella's legislation, H.R.191—it's exciting for us to hear testimony on the parameters of where that legislation can improve such things as encouraging work and cooperation with our Federal laboratories, to protect the software from unfair competitive practices, to ease innovative methods of technology transfer that we have had hearings on many times in this subcommittee before, and to overall look at ways by which we improve and address our economic competitiveness, domestically and internationally.

I'm hopeful that we can get some added insight. I know we will from people like Dr. White. I'm excited about the possibilities and the potential of the hearing this morning and hope that maybe it adds potential chapters onto Daniel Bernstein's book in the future and salute again your leadership on this.

Mr. THORNTON. Thank you very much, Tim.

Dr. White, we are delighted to have you appear before this committee again. We do have your prepared statement, which without

objection will be entered into the record as though it were fully read to us, and I would appreciate your giving us an appropriate summary of your thoughts concerning this issue.

STATEMENT OF HON. ROBERT WHITE, UNDERSECRETARY FOR TECHNOLOGY, UNITED STATES DEPARTMENT OF COMMERCE, WASHINGTON, D.C.

Dr. WHITE. Thank you, Mr. Chairman.

It is indeed a pleasure to be here to represent the Administration to support the legislation that, as we have said, is specifically designed to promote commercialization of software that is being developed largely by our Federal employees.

This is an issue that has been of great interest for some time to both Congress and the Administration. The Department of Commerce, in fact, has issued a number of reports and testified several times in support of legislation, and Secretary Mossbacher himself has called for it in reports on agency implementation of the Federal Technology Transfer Act again this last July when he submitted a proposed bill.

Accordingly, I am pleased that this legislation, H.R. 191, which is based on the Administration's proposal, is getting the attention that it deserves. And I do want to thank Mrs. Morella and you, Mr. Thornton, for your interest and support in this.

I think this support comes at a particularly important time in the evolution of software. I think software is becoming an increasingly important element in our competitiveness. You just have to pick up the newspaper and look at the alliances between former adversaries in the areas of software, or just look at all the new developments that seem to be occurring in the software, in the technology. It's becoming more and more of an important element in areas such as telecommunications and in manufacturing.

A decade ago, the most expensive computing function was processing power, and that was followed by memory, which was followed by the data, followed by the network, and then only software. But in the 1990s, the most expensive and critical functions will be the software with memory and processing power having become commodities.

The software industry has been experiencing enormous growth, as you know. Last year, the industry grew 20 percent to a level of somewhere in the order of $30 billion.

That growth has come somewhat from increased productivity, measured however you want to it—lines of code or so forth—but part of that increase has also come largely, I think, from the influx of programmers. Unfortunately, as we look at our universities, we find that the number of students enrolling in computer science is actually going down now from the peak it had reached a few years ago. On the other hand, there are enormous numbers of programmers in the Federal labs. So I believe it's really in the national interest that the scientists and engineers and other technical people with software skills, who work in our Nation's Federal laboratories, should be encouraged to work with industry to help meet the challenges and opportunities that lie ahead in the software industry.

But unfortunately, as you have all noted, this is not happening and the problem derives in substantial measure from the inability of the Government to secure copyrights in software produced by Federal employees in the course of their duties.

That these Federal agencies can be an effective partner with industry I think is now beyond question. Federal software activities at agencies such as NIST and NASA I think are at the cutting edge in this technology. But much additional work has to be done to the software that is developed in the Federal labs before it can in fact be marketed—documentation, maintenance, and so forth.

Throughout the Government, Federal employees are producing a vast array of software that is useful for everything from vocational training to predicting the spread of fires in different building types, to helping doctors diagnose and treat disease, to helping farmers make decisions about crops. The opportunities are certainly there.

Unfortunately, there is little incentive for either the employees to look beyond their immediate program needs, or for industry to come into the lab to take advantage, through appropriate collaborative arrangements, of those enormous skills that reside in these Government owned and Government operated, or GOGO labs.

The U.S. Department of Agriculture, for example, reports that although 5 to 10 percent of its research is in software, not one of its cooperative R&D agreements, or CRADAs, involve software development. Other agencies have also complained of lost opportunities to enter into CRADAs. In one case, a computer program that might have been used to assist dermatologists in prescribing medications for certain skin conditions was lost. Similarly, NIST found that the absence of software protection cost it the opportunity to promote the commercialization of a program called DATAPLOT that plots experimental results in a graphic form.

And these are some of the anecdotal stories that we hear about. We don't really know of all the opportunities lost from people just walking away from this opportunity.

And this situation will not change as long as we continue to lack the process to encourage the commercialization of software developed by these Federal employees that parallels what we already have for invention. With respect to inventions, we now have in place a system that allows the agencies to establish ownership rights through patents, and to convey rights to third parties, and also to share along with their employees a portion of the royalties.

As such, we have in place an effective statutory framework that does encourage employees to disclose their inventions. It also makes it easier for these facilities to attract the private sector to be a research partner.

This benefits such a partner in two ways. First of all, it relieves the company of the fear that the work that it might finance could be exploited by some other competitor, maybe somebody who is larger or in some advantageous position; and it also provides the company with an incentive to make the often substantial additional investments that are needed to convert the software into friendly software.

I think that that system is working well that we have in place for inventions. For example, we now have several hundred CRADAs in place. The number of inventions disclosed by Federal

laboratories has increased by 68 percent in the 3 years since 1987 and the agencies that are taking advantage of the Federal Technology Transfer Act have reported a 91 percent increase in royalties. At NIH, the number of patent applications since enactment of the Federal Technology Transfer Act has increased from 97 in 1987 to more than 200 last year.

So, given the record to date in the case of inventions, and the vast software experience in our Federal employee operated laboratories, and the fact that software has long been a major focus of technology transfer activities in laboratories like Oak Ridge and Brookhaven and so forth, which are contract operated Government facilities, I have every reason to believe that collaborative R&D arrangements in software represent an enormous opportunity for the GOGOs as well, such as NIST, NIH, EPA, and others.

The goal of fostering a new era in private-public cooperation will be seriously undermined if an area of enormous economic importance and Federal expertise, such as software development, continues to be regarded as lying outside the scope of the Federal technology management activities.

Commercialization of federally developed software and encouraging new collaborative relationships are not the only reasons for wanting to establish proprietary interests in federally developed software. There are other reasons as well.

For example, NIST is extremely concerned about potential liability that could result without the ability to control the use and distribution of software that, improperly implied, could cause serious harm, such as use of its fire simulation software or the software that is developed to control robots in its manufacturing laboratory. NIST makes its standard protocols for computer hardware interfaces readily available without charge in order to encourage everyone to adopt these stands. So naturally, it does not want the protocol software modified.

I guess I don't believe that there is any other way to achieve these various objections other than through the legislation that is now under consideration. I don't think patents are a practical alternative. There are a number of legal difficulties associated with that. There are very complex statutory requirements and the process can be expensive and lengthy, and that is no small matter in an industry where the product often has a very short lifetime.

Copyright, on the other hand, protects the expression of an idea. It's easy, inexpensive, and outlives the market life of the software, and protects the authorship that goes into writing, testing, and debugging, and editing the thousands of lines of code in the program. It is in fact the customary form of protection for software.

Now I am aware—Mr. Henry brought this issue up—that some individuals are of the opinion that the prohibition on copyright in Federal works buttresses the strong public policies of openness in Government and the free availability of Federal information. We certainly support those policies. We do not propose that he general prohibition on copyrights, in general, be altered, except under these circumstances. Indeed, for software with potential commercial value, the protection that the copyright provides can actually stimulate the development of this software with a much broader

benefit for the public. We don't gain anything if it sits on the shelf and is never used.

So it is in the public interest to break down this wall that divides public and private R&D collaboration and to ensure that the taxpayers in fact receive the fullest possible return on their investment in this Federal R&D. As the figures I cited a few moments ago clearly indicate, the incentives of ownership and royalty sharing for inventions are accomplishing that objective, and I think they should be extended to software.

H.R. 191 I think properly balances these interests. First, it has been carefully crafted to apply essentially the operational aspects of software rather than the informational content of any databases on which the software might operate.

Secondly, recognizing that our primary goal is to encourage still more public-private sector R&D collaboration, it applies only to the software developed pursuant to a cooperative research and development agreement entered into under the Federal Technology Transfer Act.

So in conclusion, Mr. Chairman, we can, and should, accommodate competing interests. We can, and should, get rid of the strange anomalies that we now have, such as eliminating the disparity of software treatment at GOGOS and GOCOS, or allowing GOGOs to patent a computer process but not copyright the software that tells the computer how to perform the process. In short, we can, and should, move on to the next logical step in Federal technology management and enact this important bill.

Thank you very much.

[The prepared statement of Dr. White follows:]

STATEMENT OF

DR. ROBERT M. WHITE

UNDER SECRETARY OF COMMERCE FOR TECHNOLOGY

ON

COPYRIGHT PROTECTION FOR FEDERAL SOFTWARE

BEFORE THE

SUBCOMMITTEE ON TECHNOLOGY AND COMPETITIVENESS

OF THE

HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

JULY 18, 1991

Thank you, Mr. Chairman and members of the Subcommittee. It is a pleasure to be here this morning to testify on behalf of the Administration in support of legislation to promote the commercialization of software developed by federal employees.

As you know, this is an issue of longstanding interest to the Congress and the Administration. The Department of Commerce has issued a number of reports and testified several times in support of such legislation. Secretary Mosbacher has called for it in reports on agency implementation of the Federal Technology Transfer Act and again last July when he submitted a proposed bill. Other agencies, in testimony before this Subcommittee, in the deliberations of the Interagency Committee on Federal Technology Transfer, or in response to inquiries by the General Accounting Office, have called for the correction of this longstanding problem.

Accordingly, I am pleased that this legislation, H.R. 191, which is based on the Administration's proposal, is getting the attention that it deserves and I want to thank Ms. Morella and Mr. Thornton for their continuing interest and support.

That support could not come at a more appropriate moment. Given (1) software's overall importance to our national economy, (2) the tremendous changes taking place within the software and computer worlds, (3) the possible shortages we may face in programmers and computer scientists, and (4) the tremendous

software expertise that resides within our federal laboratories, legislation that would forge stronger linkages between federal facilities and the private sector area could not be more timely.

Software is clearly one of our Nation's most important industries. The U.S. software industry is indisputably the world leader, achieving sales in 1990 of some $29 billion, or 20% above 1989 levels. This growth rate is expected to be repeated this year, with sales rising to about $35 billion. By 1995, the worldwide market in software could reach $100 billion.

Software is becoming increasingly important to our overall competitiveness. It is crucial to us not just as a commodity that affects our balance of trade, but as a tool for our own use - for managing and using data, for manufacturing a vast array of defect-free products, for tying the design, manufacturing and marketing functions of firms together - just to name a few.

Yet business is anything but "usual" in the software world. The press is full of stories about new alliances between firms that had only recently been fierce rivals or efforts to create new software techniques such as object-oriented programming. And that is just the tip of the iceberg, for the next stage of computer development is not far away. It will essentially eliminate distinctions between computers and the telecommunications media, thus accentuating the already-loud clamor for standardization and simplified data exchange.

Clearly these are exciting times for the software community.

I believe it is in the national interest that scientists, engineers and other technical personnel with software skills who work at our nation's federal laboratories should be encouraged to work with industry to help it meet the challenges and opportunities that lie ahead in the software industry.

Unfortunately, this is not happening. The problem derives in substantial measure from the inability of the Government to secure copyright in software produced by federal employees in the course of their official duties - an inability incorporated into the copyright statutes as Section 105 of Title 17.

That federal agencies can be an effective partner with industry is beyond question. Federal software activities at agencies such as NIST and NASA are often at the cutting edge of technology, designed as a prototype to prove that a concept works. Much additional work has to be done before it is marketable.

Throughout the government, federal employees are producing a vast array of software useful for anything from vocational training to predicting the spread of fires, gaseous fumes and fatalities for different building types to helping doctors diagnose and treat disease to helping farmers make decisions about their crops. We know the talent is there.

Unfortunately, there is little incentive for these employees to look beyond the immediate program needs for which they have produced software or for industry to come into a laboratory to take advantage, through appropriate collaborative arrangements, of the enormous software skills that reside in government-owned and operated labs, or GOGOs.

USDA, for example, reports that although five to ten percent of its research is software-related, not one of its cooperative R&D agreements, or CRADAs, involves software development. Other agencies have also complained of lost opportunities to enter into CRADAs with the private sector to commercialize software, such as, in one case, a computer program that might have been used to assist dermatologists in prescribing medications for certain skin conditions. Similarly, NIST found that the absence of software protection cost it the opportunity to promote the commercialization of DATAPLOT, useful for charting certain experiments in graphic form.

And those are the examples that senior officials hear about. We can never really know how many negotiations break down at lower levels when a potential collaborator learns that software protection is unavailable.

This situation will not change as long as we continue to lack a system to encourage the commercialization of software developed

by federal employees that parallels the one we have for employee-developed inventions. With respect to inventions, we have in place a system that allows agencies to assert ownership rights through patents, to convey rights to third parties, and to share, along with their employees, a portion of the resulting royalties.

As such, we have in place an effective statutory framework that encourages employees to report their inventions. It also makes it easier for these facilities to attract private sector research partners by enabling the parties to agree in advance on the disposition of any patent rights that might result from work done by federal employees under the partnership arrangement.

This benefits the partner in at least two ways: it relieves the company of fear that work which it financed will principally benefit its competitors and it provides the company with an incentive to make the often substantial additional investments that must be made to bring a federally employee-developed technology to the commercial marketplace. In the case of software, that means developing, debugging, simplifying and customizing it and developing relevant training materials.

And that system is working very well, as Assistant Secretary for Technology Wince-Smith and other Government witnesses testified at hearings held before the Subcommittee in May. For example, we

now have several hundred CRADAs in place. The number of inventions disclosed by Federal laboratories has increased by 68% in the three years since FY 1987 and agencies using the Federal Technology Transfer Act authorities have reported a 91% increase in the same period. At NIH, the number of patent applications since enactment of the Federal Technology Transfer Act ballooned from 97 in 1987 to more than 200 last year.

Thus, given the record to date in the case of inventions, the vast software experience at our federal employee-operated laboratories, and the fact that software has long been a major focus of technology transfer activities at Oak Ridge, Brookhaven, Lawrence Livermore and other contractor-operated government facilities, I have every reason to believe that collaborative R&D arrangements in software represent an enormous opportunity for agencies such as NIST, NIH, EPA and others.

Or, to put it even more bluntly, the goal of fostering a new era in private-public cooperation will be seriously undermined if an area of enormous economic importance and federal expertise, such as computer software, continues to be regarded as lying outside the scope of federal technology management activities.

Before proceeding, let me note that commercialization of federally developed software and encouraging new collaborative relationships are not the only reasons for wanting to establish

proprietary interests in federally developed software. There may be other reasons as well for asserting an ownership interest.

For example, NIST is extremely concerned about potential liability that could result without the ability to control the use and distribution of software that, improperly employed, could cause serious harm, such as it its fire simulation software or software that controls robots. Similarly, NIST makes its standard protocols for computer hardware interfaces readily available without charge in order to encourage everyone to adopt these standards. Naturally, it does not want the protocol software modified.

Having discussed the matter with our experts, I do not believe there is any other way to achieve these various federal software objectives other than through the legislation now under consideration. Patents are not always a practical alternative. There are any number of legal difficulties. You have to meet the complex statutory requirements and the process can be expensive and lengthy, no small matter in an industry where the product often has a short economic lifetime.

Copyright, on the other hand, which protects the expression of an idea, is easy, inexpensive, outlives the market life of the software, and protects the authorship that goes into writing, testing, debugging and editing the thousands of lines of code in

a program. It is the customary form of protection for software.

I am aware that some individuals are concerned that the prohibition on copyright in federal works buttresses strong public policies of openness in Government and the free availability of federal information. The Administration strongly supports those policies. We do not propose that the general prohibition on copyrights be altered, except in these limited circumstances. Indeed, for software with potential commercial value, the protection that copyright provides can actually stimulate the release of innovative ideas into the public eye.

It is also in the public interest to break down the walls that often divide public and private R&D collaboration and to ensure that the taxpayers receive the fullest possible return on their substantial investment in the federal R&D establishment. As the figures I cited a few moments ago clearly indicate, the incentives of ownership and royalty sharing are accomplishing that objective and should be extended to software.

H.R. 191 properly balances these interests. First, it has been carefully crafted to apply essentially to the operational aspects of the software rather than the informational content of any databases on which the software operates.

Second, recognizing that our primary goal is to encourage still

more public-private sector R&D collaboration, it applies only to software developed pursuant to a cooperative research and development agreement entered into under the Federal Technology Transfer Act or other equivalent authority, such as Section 203 of the National Aeornautics and Space Act.

In conclusion, Mr. Chairman, we can, and should, accommodate competing interests. We can, and should, get rid of the strange anomalies we now have, such as eliminating the disparity of software treatment at GOGOs and GOCOs, or allowing GOGOs to patent a computer process but not copyright the software that tells the computer how to perform the process. In short, we can, and should, move on to the next logical step in federal technology management and enact this important bill.

Thank you. That completes my statement. I will be pleased to answer any questions you may have.

Mr. THORNTON. Thank you very much, Dr. White.

Let me begin by addressing the question you referred to in distinguishing the operational functions of computer technology from the data portions, computer memory and dissemination of information. As you know, the statutes which prohibited the Federal employees from having copyrights for over 100 years referred to copyrights in publications. That is, books, information, data. It would seem to be inappropriate for the Government to write a book through its employees and then not disseminate. That clearly addresses the question Mr. Henry has suggested.

However, I was on the Judiciary Committee at the time the revision of the copyright laws began. And while the record does not disclose what went into the changing of words in the 1976 act, the issue that we were addressing was that there were new ways of publishing information. Tape records, VCRs were around the corner. There were interests in the rights of artists and musicians to maintaining their copyrightable expressions.

So the law changed and addressed the question of works, which was a huge expansion in the prohibition against Government employees. Would you address this issue? Are you familiar with that change?

Dr. WHITE. I guess I'm familiar with the situation you're describing. I certainly would not—I think what we're dealing with here is a very restrictive portion of this. We're talking really about the—if you like—the software itself which really encompasses the instructions to the computer system to do what it's supposed to do and not embody any of the informational content, which I think should remain free.

Mr. THORNTON. One of the things that concerns me about the limitations that are contained in the bill is that it may give rise to some difficulties where, for example, the private sector is considering whether or not to enter into a CRADA or a cooperative research agreement with a Federal laboratory where part of the consideration on which the entry into this dissemination might be based on whether there is a valuable product there. Perhaps it has already been thought of. Is there a rationale for extending this protection in a limited way, beyond the institutions where a CRADA has already been formalized and everybody has gotten together and then an invention comes along, to an invention which might become the subject of a cooperative agreement?

Dr. WHITE. I think we should distinguish between inventions—

Mr. THORNTON. I'm using the word invention and I should not be. Idea. New idea. A copyrightable idea.

Dr. WHITE. I think if you have a copyrightable idea— and usually the experience is that over time these ideas get modified and added to and I think that copyright protection would apply to the enhancement and the new aspects of this. So if you already had some basic idea at the time the legislation was based, presumably, it would not be affected, but you would go on and copyright the enhancements and the—

Mr. THORNTON. No, I'm not seeking to grandfather ideas into the coverage of this, but rather to recognize that there are cooperative agreements which are in process and may not yet have attained the statutory definition of a CRADA.

Dr. WHITE. Yes, and I would think—our hope is that the opportunity to have a copyright protection will stimulate the formation of CRADAs. And our hope would be that—and in fact we have many examples of situations where people have expressed an interest in developing technology and establishing a CRADA with NIST, for example, and they have decided not to do that because of the lack of copyright protection.

Mr. THORNTON. You have referred to some anecdotal material to illustrate that. Do you have other examples you would like to call to our attention, or shall we rely on your written material?

Dr. WHITE. I think that there are examples within the Department of Agriculture. I think that software has been developed to help people predict crop development and so forth. These, again, are examples where people have looked at those and have declined to invest in them just because of the fact that they don't have that protection.

I think in the case of the NIST example that I cited, they actually advertised in the Federal Register that they had this opportunity and there were something of the order of a dozen companies that expressed interest, but as soon as they learned that there was not the opportunity for copyright protection, they dropped that interest.

Mr. THORNTON. Two additional points flowing out of that — without such legislation, what is to prevent the results of a useful American Government employee's idea being used freely by a foreign country or a foreign corporation? Is there any?

Dr. WHITE. There is none, and in fact that happens quite frequently. There was an example of a three-dimensional structural software package that was developed at Lawrence Livermore Laboratories that was picked up by the Japanese and productized and is now sold on the market.

Mr. THORNTON. I can only speak from my own background on this, but I think it would have been better for our country if we would have had some means of implementing that idea and developing it and providing a few jobs here in America.

Dr. WHITE. I couldn't agree with you more.

Mr. THORNTON. How and under what guidelines might it be — well, my question is, how will small businesses fare in this kind of operation? Is it going to relate entirely to the giants who can come in, or will there be some benefit for small businesses?

Dr. WHITE. No I think—as I mentioned in my testimony — I think this would be particularly beneficial for small companies because they are the ones that need the protection. If a small software development company comes and picks up some of this software and it is not protectable, and they go ahead and start to enter into the productization stage, it could be that a larger company with greater resources could come in and leap frog and take their advantages away.

Mr. THORNTON. Thank you very much, Dr. White.

Mr. Henry?

Mr. HENRY. Thank you, Mr. Chairman.

Again, I think we all understand the problem. I guess I want to play Devil's advocate on the fix, although I voted for this in the past. I have been going over it, and I am a little afraid because of a

series of amendments that will be coming up right after general debate and we're going to be attacked right at the time we get on our witness list the IIA's testimony. I'm kind of struggling over that and maybe it's good if I raise some of their questions with you so that we get a little interaction.

I'm certainly no math or computer whiz—I enjoy it as a hobby—but they raise some issues. One is, Can you really distinguish, as you suggested in your testimony, between the computer program and the database? If I have—let's say with the new census data, which presumably has a lot of commercial marketability at the Department of Commerce. I mean, every retailer, wholesaler, marketer, is going to be milking it for demographic projections and things like that for the next 10 years. In fact, that's one of the biggest problems your department has is keeping questions off the census that everyone wants on for commercial reasons.

When that tape is provided by the Government, you have to manage it and package it with your own self because of the unique character of the data. It is packaged really with its own software to manipulate the data.

Now is that a database, or is it a software program?

Dr. WHITE. I don't know how you resolve some of those difficult things except for the fact that it has to be managed and the Government does have the right to waive the copyright. If they decide that this is an area where the software and the data is so intertwined that it is best to leave it in the public domain, they would have the right to waive the copyright.

Mr. HENRY. But how do we make that—for example, the House information computer system that most of our offices are hooked on is the most cumbersome. You wait forever for a response. I am told that it is designed that way, though, because of the massive volume of record keeping involved with congressional correspondence. They say there is no commercial equivalent. We're getting 500 to 600 letters of communications a day. You're piling them up and need instant access. If you're here for 20 years, you have 20 million pieces of mail that you're trying to figure out the records of local correspondence and so on and so forth. So it is a very slow system.

To what extent is that database—do you see what I'm saying? The software and the data are so intertwined because of the nature of the problem. Have you been perhaps just a little bit too simple in suggesting that we can—what you're really saying is that the legislation—understand that I'm not opposing, but I'm just trying to raise this question— your answer to that is really to admit that we can't make always such a clear distinction but that the refuge you take is that the agency would have the discretion, then, to not exercise its copyright privileges or would exercise them with great restraint.

Dr. WHITE. I think that this would—presumably the development would be involved with a CRADA and the terms and conditions under which you develop a CRADA would give both parties opportunity to look at what the issues are. It's not an issue of taking whatever this software is and making it available. We're talking about doing this under the framework of a CRADA so that presumably the industrial partner that you were doing this with would

have some objectives in mind and the laboratory that—I mean, the way the Federal Technology Transfer Act reads is that it is at the discretion of the laboratories themselves how they enter into these agreements.

So there would be discretion on the part of the laboratory itself.

Mr. HENRY. To what extent can the CRADA be reopened? You can do that going in, but then you don't know what you have until you come out. Is there a look-back provision in the CRADA arrangement?

Dr. WHITE. What do you mean by look-back?

Mr. HENRY. Well, I think in some of these cases you don't know what you're going to have until after you have it.

The chairman gave the Livermore example, the Japanese exploiting commercially—database applications, was it?

Mr. THORNTON. I think it was computer software.

Dr. WHITE. This was software that was developed for imaging. It was an imaging program of some sort.

Mr. HENRY. Now—

Dr. WHITE. Which is a cleaner example because it doesn't have a database associated with it.

Mr. HENRY. I was thinking in terms of the IIA's testimony—and I don't want to steal their thunder, but I think it's important to interact. Sometimes we don't. They use the Ashton-Tate issue in terms of they commercialized a data manipulation system. They said apparently they drew off a Government data bank program and they got into some kind of copyright dispute in the courts in terms of whether or not they could copyright with or without acknowledgement of Federal indebtedness and so on and so forth.

I guess I can't rip off Ashton-Tate with a knock off, but I could come back, if I'm another vendor, and use that same Federal database and thereby simulate universal language and greater compatibility. One of the whole problems—more so 10 years ago than now—is the lack of compatibility, particularly when you're talking about commercial use. It's probably less important in the scientific community. Will this inadvertently again begin to fracture the universality of program exchanges?

Dr. WHITE. I'm trying to look at this in terms of what Apple and IBM are trying to do. They call the machines and programs talk to each other.

Mr. HENRY. Are we going to go backwards in that area? Would that be counterproductive to commercialization and development?

Dr. WHITE. I guess the thing we are envisioning more here are applications software that is developed for particular applications that have dual uses, if you like. What we would like to see is that software be developed. And in fact, the Government would like to encourage it to be developed and somebody take care of the maintenance and debugging and so forth associated with it. They do then have royalty free access to it. So there is an advantage there for the Government as well.

Mr. HENRY. If—I'm just drawing another from the IIA because it then will help when they give their testimony, too. They cite as an example a recent action by the House Merchant Marine Committee approving legislation directing the Maritime Commission to charge a copyright-like royalty for on-line access to computerized tariff

data, not only by information vendors who obtain the data directly from the agency, but also by subsequent parties in the distribution chain.

Now I presume—first of all, we're saying that's simply a user fee to pay for the cost of putting the data together and with an add-on for the development cost for the program, which is attendant to the program, to manipulate the data and utilize it. That's just a cost recovery user fee. I'm presuming.

Now I see nothing wrong with that, and we do that quite often, do we not, in traditional print data. Cost recovery—

Dr. WHITE. I think there's an example that I'm familiar with. NIST generates an enormous amount of materials data and this Congress has given them the right to copyright this because they want to control it. They want to know where it's at and they only want to be able to have the opportunity to update that. So that's a case where you have a large database that in that case has been copyrighted for the purpose of maintaining its integrity.

Mr. HENRY. What concerns me is—

Dr. WHITE. I guess what I'm saying—there's an example of where one looked at a particular application and decided that it was data and should be copyrighted. Presumably there are other cases under this, if this legislation were enacted, where there might be cases where you would explicitly exclude data for the purposes of making it available. I think it would have to be something that was negotiated on a case-by-case basis.

Mr. HENRY. We all understand the problem as an abstraction. There are so many different ways in which this could conceivably fall in terms of type of data, type of programming, and any mixture. I think that's what the concern is here, yet you can't legislatively sort all this stuff.

Dr. WHITE. You can't legislate every example.

Mr. HENRY. I don't like the fact that because we are a more open society the Japanese or others rip off—to be colloquial—our public research. But there are lots of things we suffer as an open society compared to other countries. That is part of the price that we pay. On the other hand, this is so strictly commercial that it becomes particularly repelling. And that's one thing that drives us very motively.

But the flip side is that as you try to nail that down, and also to stimulate joint research agreements, which include the utilization and development and commercialization, are you also inadvertently freezing out other market forces that would like to participate with the use and development and application of the data program, which I will hyphenate rather than slash—well, I'm not sure I'm a market analyst. I would like to know how an analyst at the New York Stock Exchange would look at this in terms of how it would impact major versus minor software companies. Maybe that would give me a hint to my answer. Which stocks would go up and which ones would go down with this?

Maybe Mr. Chairman can get that information for us.

Does the chair follow—

Mr. THORNTON. I follow. I do follow. I want to compliment the gentleman for bringing this dimension to this witness' testimony. I think it's very appropriate to have an interaction between the con-

cerns for openness and for improving our competitive position, which you are addressing.

I was going to pursue this line of thought with some questions of our witness, but I would be pleased to either do so now, if you would yield, or—

Mr. HENRY. I will shut up. I can take the hint, Mr. Chairman. [Laughter.]

Mr. HENRY. I just think it's very important that we not allow the last testimony—because we're all agreed as to the nature of the problem that you're outlining. The rub is whether we're inadvertently making some assumptions in all this that aren't right.

Mr. THORNTON. And I think there are some easy to define examples of where the software is clearly not an accumulator of data. The example from the Livermore labs, which I was hoping to get into the record, where it was an imaging technique had nothing to do with the accumulation of data. There was nothing that the public had a right to know. It was a remarkable idea or discovery which could lead to economic advantage. Because the law drawn to cover the one, namely the data, the freedom of access, also covered the other, we were at a disadvantage.

I should ask for your comments on this. Do you agree?

It seems to me that you could take a prism and spread visible light across the room here and no one here would have difficulty in being able to identify the reds, and the blues, and the greens, but it might be a problem telling where one ends and the other begins.

It seems to me that there are some examples where we can clearly define which ideas should be copyrightable and which should not. That being so, it seems to me that—and I'm going to ask you to comment on this—that the role of legislation should be to target the policy and then leave to the Administration the decision as to whether a particular discovery, idea, falls within the red band or within the orange or the green band.

How do you react to that?

Dr. WHITE. I think you're absolutely right. I think that at some point in the implementation of this, judgment has to be exercised. Under the Tech Transfer Act, as it is now, within each laboratory when CRADAs are being set up, a decision is being made that, yes, this is something we want to try to commercialize. This is something we want to try to develop incentives for our employees for and so forth. The fact is that there are currently about 500 CRADAs in existence. I think each one of those involves some judgment that this is something that is appropriate for the Government to enter into a relationship with the private sector in terms of commercializing it.

I think that if a laboratory had a database of some sort that clearly was—could be used and was being used by a broad sector of the public, they would—I would hope—exercise the judgment not to give an exclusive license to somebody to develop that. Or they may wish to give non-exclusive licenses to somebody to develop something. That also could encourage multiple use and development for different purposes.

So there are options that you have when you actually implement this. What it is doing is giving us that opportunity to go beyond where we are now.

Mr. THORNTON. I am not a computer expert at all, but I would like to give an analogy and see whether or not it might be appropriate.

The original prohibition of the copyright laws was against copyrighting the publication, that is the book. It did not cover whether or not a proprietary right might exist in the printing press or in the xerox machine or in the other means for accumulating and handling and disseminating the data. Now it is my understanding that in a computer the printing press and the data are often commingled and that it ought to be possible to sort out which parts of the software, what part of the idea, is the idea to make it possible to do that, as contrasted with the storage of information.

Is the analogy at all appropriate?

Dr. WHITE. Well, you're coming close to a very difficult area that relates to probably the patenting of software.

Mr. THORNTON. But as you say, patenting is a very cumbersome process.

Dr. WHITE. It's very cumbersome, and that does take on the challenge of going even further and looking beyond just the structure of the software and looking at the fundamental algorithms that underlie it. And that is not what this is about.

Mr. THORNTON. Mr. Henry, I am trying to build on what you were—

Mr. HENRY. I was just going to give an analogy that occurred to me.

Remember in the committee several months ago, in the full committee we had a lengthy discussion on Mr. Torricelli's amendment on whether or not American manufacturers of pay loads would have to launch on American-made launch vehicles unless the American-made launch vehicles were not capable of launching that particular kind of pay load?

Mr. THORNTON. Yes.

Mr. HENRY. We strengthened it and said, no you just have to launch on an American vehicle, period. Why? Because we realized that American manufacturers of payload would deliberately create a payload that was only capable of being launched—in this case it was China—on the Japanese rocket, or whatever it is. In other words, the payload and the vehicle are inseparable.

Now when you're doing a program, you see the manipulative elements are synergistic with the data element. That's I think what I'm viewing as the problem in here now.

Thank you.

Mr. THORNTON. The gentleman from Tennessee, Mr. Tanner?

Mr. TANNER. Thank you. I apologize for being late, but I don't have any questions at this time.

Mr. THORNTON. Thank you very much.

Mrs. Morella?

Mrs. MORELLA. Thank you.

First of all, I want to apologize for slipping into the room next door, which is where my other subcommittee of Science, Space, and Technology is marking up two bills, and one I offered an amendment on is the Biodiversity and Conservation Act, and the other that I went in to vote on another amendment was the Indoor Air

Quality—so I preface giving an excuse that that's the kind of duplication that is taking place at two subcommittee meetings.

I had read your testimony and I'm glad I came in at a point where Mr. Henry was posing some of the concerns that are so intricate to the situation and complex. Our chairman, Mr. Thornton, has been pulling out some further beginnings of elucidation of it. I think it's all very important.

He may have also—I know at one point in your testimony, Secretary White, you did comment on whether or not the CRADA mechanism would block public access to already existing federally generated computer software, but I wondered, for the record, if you wanted to make a comment on that, too, something that I probably will be asking the other people who have testified, too.

Dr. WHITE. No, I don't think that it would. I think that experience shows us that in fact this would stimulate— having a CRADA mechanism would in fact stimulate more commercialization.

Mrs. MORELLA. That's one of the concerns that some people have had and I knew that you were going to come out in favor of it and I appreciate your giving that information.

Also, one of the questions that we've had, too—and maybe this was addressed when I was gone—but whether or not this legislation or the copyright protection should be extended to the computer software outside of the CRADA mechanism. Should this be the case? Would it assist greatly? Would there be other protections that would be needed?

Dr. WHITE. I think that when we look at this from the point of view of commercialization, obviously there is a lot of opportunity that already exists that is not covered by CRADAs. I think that the first step is to create the copyright protection under the CRADA umbrella. I think that that will in fact pull in many of the opportunities that we're concerned about.

Mrs. MORELLA. And then move from there. Is that what you're saying?

Dr. WHITE. I think we would have to see—you know— how many of the—I mean, the purpose of copyrighting this software is in fact to commercialize it. I think that once we have a CRADA mechanism—I think they're inseparable in some sense. I think that if you have the opportunity to just copyright something without having a CRADA to actually commercialize it probably is not something that you necessarily want to do. But I think that having the CRADA initially is where the action is at.

Mr. THORNTON. Mr. White, I would like to continue to pursue this with—if you would yield—

Mrs. MORELLA. Indeed. In fact, I'm going to go vote and come back again, but I knew this was something, Mr. Thornton, that I had talked about that he also had expressed an interest in.

Thank you.

Mr. THORNTON. Thank you.

Pursuing the thought, the concern that some of us have is that CRADAs do not yet cover as much ground as it is hoped that they will cover—I want to applaud you for your leadership in moving forward on the development of CRADAs— also the concern about whether the absence of a CRADA might inhibit the formation of one if the information is presently not covered by copyright laws.

Do you have any comment on that?

Dr. WHITE. Well, I mean, the data at present indicates that without that copyright protection people are not interested in forming a CRADA.

Mr. THORNTON. That's right.

Dr. WHITE. So that, although the CRADA mechanism is there for developing software, the fact that that software is not copyrightable has inhibited the exercise of those CRADAs.

Mr. THORNTON. I think I'm concerned in part about the problem of disclosure. If, as an inducement to form a CRADA or to advertise—as NIST did—that there were some ideas that might stimulate an interest, there is a chicken and an egg problem as to how much to disclose of an idea which cannot be copyrighted in order to try to stimulate the formation of a CRADA based on that idea.

Any comment? Do you see the problem, the chicken and the egg problem?

Dr. WHITE. I guess I don't see that as a problem. I think that in the cases where people have come in and looked at software that has had a potential for being commercialized, I don't think that there has been any real restrictions put on how much the Government was telling potential investors. They say this—I think it was fairly open as to what the software could do, what it was being used for, and the industrial partners I think formed their own opinions as to whether or not they could commercialize that.

Mr. THORNTON. Dr. White, I want to thank you very much for your testimony. I believe that Congresswoman Morella may have some additional questions for the record. I would like to ask if you would agree to submit your responses for the record to such additional questions that she or any other member of this committee may address to you.

Dr. WHITE. I would be pleased to.

Mr. THORNTON. We're very pleased to have had your testimony. I do not believe that it will be essential for your to remain for the balance of the hearing, as I'm sure you have many other things to do, however, you would be welcome. If you stay around, you might get called back up for some more answers.

[Laughter.]

Dr. WHITE. Thank you very much.

Mr. THORNTON. Would the other members of our morning panel please come forward?

We are very pleased to have this morning Ms. Dorothy Schrader, the associate register of copyrights for legal affairs of the Library of Congress; Mr. James Chandler, professor of law, National Law Center, George Washington University; Mr. Mauro Togneri, vice chairman of Intellectual Property Committee of the IEEE of the United States; and Mr. Steve Metalitz—I hope I've pronounced that correctly—

Mr. METALITZ. That's right, Mr. Chairman.

Mr. THORNTON.—and the vice president and counsel for the Information Industry Association of Washington, D.C.

I want to express for the committee our appreciation at your preparation of testimony. I have had an opportunity, as other committee members have, of reading your prepared testimony and in the interest of time, and in the interest of being able to get some

questions based on your written testimony as well as your oral testimony, I do want to ask that you summarize your comments. We will hear from each of you first, in order, and then we'll have an opportunity to address questions either to each of you or to you as a panel and let you respond.

Ms. Schrader, would you begin?

STATEMENT OF DOROTHY SCHRADER, ASSOCIATE REGISTER OF COPYRIGHT FOR LEGAL AFFAIRS, LIBRARY OF CONGRESS, WASHINGTON, D.C.

Ms. SCHRADER. Thank you, Mr. Chairman and members of the subcommittee. I am Dorothy Schrader, associate register of copyrights for legal affairs in the Copyright Office of the Library of Congress. I thank you, Mr. Chairman and the members of the subcommittee, for giving the Copyright Office the opportunity to appear before you today at this important hearing on copyright of federally developed software and ways to transfer this important Government resource to the private sector.

As has been noted, the bill, H.R. 191, would amend title 15 to permit Federal agencies to secure copyright in software prepared by Federal employees as part of cooperative research and development agreements, thus overriding the prohibition in section 105 of the Copyright Act, which stands against copyright in works created by Federal employees.

There have, of course, been prior legislative proposals to change the copyright law affecting Government ownership of works produced by Federal employees. Last year, the General Accounting Office made several recommendations regarding amendment of the Federal Technology Transfer Act and essentially the Morella bill embodies those recommendations.

The Copyright Office supports the principle of H.R. 191. We think it is a limited response to a specific problem. Federal employees will be more highly motivated to create valuable software if they know they will benefit financially by doing so. Likewise, it seems reasonable that businesses could be stimulated to enter into cooperative research and development agreements with Federal labs if they know that their investments in technology will be protected. We have concluded that there is no reason to treat Government authors of computer software any differently than Government inventors.

Since the option to copyright software in the bill is part of technology transfer programs, there also seems to be no reason to establish a shorter term of protection for Government authors. I don't think the Government will hoard the software that is developed. The legislation itself facilitates distribution of the software through these cooperative programs.

Moreover, legislative branch agencies should be allowed to copyright cooperatively developed software. We haven't developed any to date, but the Library of Congress does have a preservation laboratory. It has patented some inventions developed by that laboratory, and it enters into cooperative research agreements with private sector entities and foreign libraries. The Library of Congress would like to have the benefit of the legislation that is enacted.

We are not a Federal agency as defined in the Stevenson- Wydler Act. An amendment could be made perhaps to Section 3710(a) of title 15, which has its own set of definitions. Of course, an alternative to the bill itself is to consider amendment of the Copyright Act and make any necessary cross references to the Stevenson-Wydler Act. We do have a slight preference for some amendment of the Copyright Act since this is a significant copyright policy change, unlike the case with patents where before the Stevenson-Wydler Act was passed you already could have Government patents. This would be a change in policy.

Historically, the prohibition against copyright in works of the U.S. Government was enacted to give unlimited public access to important information and to prevent the Government from exercising censorship. Until now, the primacy of wide-spread dissemination of Government works has prevented the copyrighting of Federal software.

However, we think the time is ripe for a change. Copyright covers works of immense economic value, and in today's highly competitive global economy, the Government copyright prohibition seems to be in conflict with U.S. international interests.

Regarding the appropriateness of copyright protection for computer software, at least since 1980 it has been clear that software is eligible for copyright as a literary work. Programs are expressed in writings in the form of source and object codes. Internationally, the Government vigorously presents the case for protection of computer software by copyright, and we have been successful in persuading most governments that copyright is an appropriate system of protection.

Let me contrast copyright with patent law in the context of software. Copyright protects only an author's expression. Copyright specifically does not protect ideas. It does not protect processes, systems, concepts, or discoveries. On the other hand, utility patents— although I am not a patent expert, but I am basing this on information in a recent study that we have done cooperatively with the Patent Office— utility patents are granted for inventions that are processes, machines, manufacturers, or compositions.

As I said, the copyright protection is available only for the expression in the program, not for any underlying process. Patent protection is not, per se, available for software, but it is available for a process performed on a computer if the process is not merely a mathematical algorithm or a scientific principle.

The steps in a patented process may, however, be performed according to a program executed by a computer and during the life of the patent, use of the program to practice the patented process might infringe the patent if this wasn't authorized by the patent owner.

Now, Mr. Chairman, in your questions of Dr. White, you were asking about the development of the copyright law in 1976, and particularly about the change from "Government publications" to "works of the United States Government". The Chairman is entirely correct. There was a major change and I will take just a few minutes to describe this.

The prohibition on copyright in Government publications came into the copyright law through the printing law. In 1895, when the

Government Printing Office was created, there was a decision made to be able to sell the plates that the Printing Office prepared to the private sector, but there was concern that no one should then have a copyright in the works that would be reprinted from those plates. So the principle was developed that there shouldn't be any copyright in Government publications. That was carried over specifically into the Act of 1909 and was in the law until the Act of 1976.

Part of the general revision of the copyright law in the 1960s and 1970s, there was a very thorough consideration of the whole question of Government copyright and the prohibition on copyright in Government publications. After much debate, the decision was taken that there would be a general prohibition on copyright in works by Federal employees. However, this is not a prohibition on copyright in works funded by the Government. The Government funds many works and the Government has the power to allow the private contractor to copyright that work if Federal employees are not involved in the development of it.

So the line was drawn on that basis. If Federal employees are involved in creating the work, then there can't be any copyright in it. If the project is simply federally funded, then the agency has the discretion to allow the copyright. At least in my opinion the federal agencies have the discretion in terms of contract law. The copyright law itself would seem to allow the private contractor to have protection, but the contract with the agency will control whether there is in fact any exercise of copyright.

Mr. THORNTON. I appreciate that additional information.

Ms. SCHRADER. So then in conclusion, Mr. Chairman, copyright is the predominant intellectual property system for the protection of computer software. Federal agencies, including legislative branch agencies, should be allowed to claim copyright in cooperatively developed software. The bill that is pending would effect this change and we think it would stimulate creativity in the private and public sectors.

Thank you. I would be pleased to respond to questions.

[The prepared statement of Ms. Schrader follows:]

STATEMENT OF DOROTHY SCHRADER
Associate Register of Copyrights for Legal Affairs

Before the Subcommittee on
Technology and Competitiveness
Committee on Science, Space and Technology
House of Representatives
102nd Congress, 1st Session

July 18, 1991

Mr. Chairman and members of the Subcommittee, I am Dorothy Schrader, Associate Register of Copyrights for Legal Affairs, Copyright Office, Library of Congress. I thank you and the members of the Subcommittee staff for giving me the opportunity to appear today in this congressional hearing on copyright of federally developed software and ways to transfer this government resource to the private sector. H.R. 191 (introduced by Representative Morella) the "Technology Transfer Improvements Act of 1991," would amend title 15 to permit Federal agencies to secure copyright in software prepared by its employees under cooperative research and development agreements, notwithstanding the prohibition, in section 105 of the Copyright Act, against copyright in works created by United States employees. The Copyright Office testified last year before this Subcommittee at the oversight hearing on technology transfer and the restrictions on copyrighting computer programs created by employees of the Federal government.

Today, I will discuss H.R. 191 against the backdrop of section 105, which currently prohibits copyright protection for works of the U.S. Government. I will also discuss earlier proposals to change the law,

including the conclusions of the Government Accounting Office, published March 1990. [1]

1. H.R. 191.

The Stevenson-Wydler Technology Innovation Act of 1980, 15 U.S.C. §3710 et seq., currently permits the federal government to enter into cooperative research and development agreements with a variety of parties, including private corporations, and to own and license patents. The Morella bill, H.R. 191, would amend several sections of the Stevenson-Wydler Act to grant similar rights to copyright computer software. Specifically, executive agencies could secure copyright on behalf of the United States, as author or proprietor, in computer software prepared by federal employees within the scope of their employment under a cooperative research and development agreement. Agencies would also be able to license or assign software copyrights, retaining a "nonexclusive, nontransferable, irrevocable, paid-up license to reproduce, adapt, translate, distribute and publicly perform or display the computer software throughout the world by or on behalf of the Government and such other rights as the Federal agency deems appropriate." §2(a).

H.R. 191 defines the term "computer software" to mean "computer program," as that term is defined in title 17, [2] but additionally includes

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1 Copyright Law Constraints on the Transfer of Certain Federal Computer Software With Commercial Applications (GAO/T-RCED-90-44, March 7, 1990)["1990 G.A.O. Report"].

2 A "computer program" is a "set of statements or instructions to be used directly or indirectly in a computer to bring about a certain result." 17 U.S.C. §101 (1976)(definition of computer program).

"associated documentation, supporting materials, or user instructions." §2(b).

Finally, the bill would amend the Stevenson-Wydler Act to permit the payment of royalties to authors of computer programs who are federal employees consistent with the existing scheme for paying patent royalties to federal inventors. §3.

Significantly, the Morella bill does not directly amend title 17. Title 15 is amended instead, and the bill creates an exemption to section 105 of the Copyright Act [3], and effectively alters the work-for-hire provision in section 201(b), [4] to permit the federal government to be considered an author of a program created within the scope of federal employment. Additionally, the definition of computer software in H.R. 191 is broader than the term computer program in section 101 of the Copyright Act. This is probably of no significance, though, since documentation, supporting materials or user

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[3] Section 105 specifically prohibits copyright protection for U.S. Government works: "Copyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise." 17 U.S.C. §105 (1976).

[4] Section 201(b) does not mention government works, but it is the Copyright Office's view that reading sections 105 and 201(b) together, the federal government cannot claim copyright as the employer-author of a work-made-for-hire.

Section 201(b) provides that:

> In the case of a work made for hire, the employer or other person for whom the work was prepared is considered the author for purposes of this title, and, unless the parties have expressly agreed otherwise in a written instrument signed by them, owns all of the rights comprised in the copyright.

17 U.S.C. §201(b).

instructions, are usually published with the computer program and copyrighted as literary works, also. Finally, the bill grants to the federal agency involved in the cooperative research and development agreement the choice of securing a copyright, or retaining a license that grants all of the exclusive rights of copyright ownership in section 106 [5] of the Copyright Act plus "such other rights as the Federal agency deems appropriate." §2(a). Although this language is rather broad, we assume there is no intention to accord the government rights beyond the scope of copyright.

2. Prior Legislative Proposals.

Past proposals to change the law affecting government ownership of computer software produced by federal employees took many forms. The "National Defense Authorization Act for Fiscal Years 1990 and 1991," S. 1352, introduced last Congress, closely tracked the rights H.R. 191 confers and would have granted to the government a "nonexclusive, nontransferable, irrevocable, paid-up license," as well as bestowing the right to "create derivative works for or on behalf of the United States throughout the world [from] such technical data or software." [6] By the time the defense appropriations bill was signed into law, however, the provisions relating to copyright were deleted. [7]

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5 The owner of copyright in a work has the exclusive right to do or authorize reproduction, the preparation of derivative works, the public distribution of a work, as well as the public performance or display of a work. 17 U.S.C. §106(1)-(5).

6 S. 1352, 101st Cong., 1st Sess. 535-536 (1989).

7 See Pub.L. No. 101-189, §§3131-3133, 103 Stat. 1674, 5187-5192 (1989).

In the 100th Congress, S. 1480, the "Department of Energy National Laboratory Cooperative Research Initiatives Act," sought to create property rights for government laboratories, without clarifying the relationship of the proposed legislation to the Copyright Act's prohibition against federal government copyright. [8] It was the Copyright Office's opinion that, based on the legislative history of section 105, works produced for the federal government by an independent contractor or under a federal grant would be eligible for copyright protection. However, without amendment, section 105 would bar protection of copyrightable subject matter produced by laboratory employees in the course of their government employment.

The G.A.O report suggested amending the Federal Technology Transfer Act [9] to allow federal agencies to copyright and exclusively license federal computer software under a cooperative research and development agreement with a private business enterprise. Such an amendment would allow the software to be copyrighted only if the private party were willing to further develop and commercialize the software. [10] The G.A.O. also suggested amending a section of the Federal Technology Transfer Act to establish a royalty sharing system similar to that now in effect for federal inventors. [11] The amended law would entitle employees developing commercially valuable software and mask

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8 See S. 1480, 100th Cong., 1st Sess. (1987).

9 15 U.S.C. §3710 (1988).

10 1990 G.A.O. Report, supra, note 1.

11 See 15 U.S.C. §3710(c).

works to royalty income. [12] These recommendations formed the basis for the Morella bill. [13]

3. Copyright Office Views.

The Copyright Office supports the principle of H.R. 191. It is a limited response to a specific problem. Federal employees will be more highly motivated to create valuable software if they know they will benefit financially by doing so. Likewise, it seems reasonable that businesses could be stimulated to enter into cooperative research and development agreements with federal labs if they know that their investments in technology will be protected. There is no reason to treat government authors of computer programs any differently than government inventors.

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12 Legislative Changes For Federal Copyright Authority Proposed By Federal Agencies' Intellectual Property Counsels (GAO, undated).

13 G.A.O. made four other suggestions:

1. Amend title 17 to revise the definition of computer software, for purposes of the Federal Acquisition Regulation (FAR).

2. Amend sections 105 and 903 of title 17 in conformity with the Patent Act, 35 U.S.C. §§207-209, to give federal agencies authority to issue exclusive, partially exclusive or nonexclusive licenses to use works, and to protect various other agency rights -- such as the right to terminate a license and the right to require periodic usage reports. The government's right to derivative works developed by a licensee would be subject to agencies' implementing regulations and/or negotiation of a licensing agreement.

3. Address the relationship of these suggested changes to the Freedom of Information Act.

4. Consider whether to accord the same rights to government creators in title 17 as are granted to government inventors in title 35.

On the other hand, the legislative history of the 1976 Copyright Act shows that the issue of copyright protection for government-created works was specifically considered, and that there were valid concerns on both sides of the issue about protecting such works in general. There is a strong policy favoring public dissemination of information. And there is always concern that agencies might misuse copyright to restrict access to federal software, or give favored access to certain groups. The G.A.O. also noted concern that copyrighting federal computer software might distract researchers from the laboratory's basic mission or interfere with informal exchanges among federal and university scientists. [14] On balance, however, the Copyright Office concludes that extending to federal software authors the analogous rights already given to federal inventors should stimulate research and development of software.

The bill will encourage maximum participation of small businesses in federally funded research and development efforts relating to computer software, as well as promote collaboration regarding software between commercial concerns and nonprofit organizations.

It does not appear that the Stevenson-Wydler Act applies to the Library of Congress, which is neither an executive department nor an executive agency. [15] Accordingly, we would suggest that the legislative history or text of H.R. 191 be clarified to indicate that legislative

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[14] 1990 G.A.O. Report, supra, note 1.

[15] See Exec. Order No. 12591, 52 Fed. Reg. 13,414 (1987), as amended, Exec. Order No. 12618, 52 Fed. Reg. 48,661 (1987).

agencies, like the Library, may also secure copyright in computer software developed through cooperative research and development agreements.

4. The Historical Background of Copyright in Government Works.

Statutes before 1895 were silent on the copyrightability of government works. However, for public policy reasons, several court decisions established that laws, judicial decisions, governmental proceedings and similar official documents were freely available and could not be copyrighted, although accompanying commentary, annotations, and headnotes were protectible. Several cases sustained a State government's copyright in additions of this sort prepared by its employees. Thus, although governmental edicts and rulings were not copyrightable, there was nothing preventing at least State governmental bodies from securing copyright in other kinds of material.

Availability of copyright protection for governmental works was changed by the Printing Law of 1895, and later solidified by the Copyright Act of 1909. The 1895 Law, which centralized printing for the U.S. Government in the Government Printing Office, contained a provision permitting that office to sell duplicate plates from which Government publications were printed. This was intended to facilitate the private reproduction of Government publications. To forestall copyright claims in private reproductions, it was provided that no publication reprinted from such plates and no other Government publication could be copyrighted. The legislative history of the prohibition in the Printing Law indicates that it was aimed at precluding copyright claims by private persons in their reprints of Government publications. It was apparently assumed that the Government itself

would have no occasion to secure copyright in its publications. Most Government publications at that time consisted of official documents. The Copyright Act of 1909 incorporated the same provision.

Section 8 of the 1909 Act provided that "no copyright shall subsist . . . in any publication of the United States Government, or any reprint, in whole or in part, thereof. . . ." 17 USC §8 (1909). The ban against copyright in Government publications did not, however, extend to the publications of State and local governments. The legislative history of the 1909 Act indicates that the issue was discussed, but proposals for a ban were dropped primarily because most States did not have their own facilities for printing, and private publishers insisted upon copyright protection.

5. The 1976 Revision.

Section 105 of the 1976 Copyright Act prohibits copyright in works of the United States government. [16] This prohibition applies to "any work of the United States Government," [17] which is defined in section 101 as "a

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16 Section 105 states:

> Copyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise.

17 U.S.C. §105.

17 An exception is provided by the Standard Reference Data Act, Pub. L. 90-396, 82 Stat. 339 (1968). A provision of this act amended title 15 of the United States Code by authorizing the Secretary of Commerce to secure copyright on behalf of the United States as author or proprietor of standard reference data. 15 U.S.C. §290(e). In addition, works created by employees of the United States Postal Service, namely, postage stamp designs, may be

work prepared by an officer or employee of the United States Government as part of that person's official duties." [18] The government cannot gain copyright in works created by its employees by being considered the author of a work made for hire. [19] It can, however, acquire copyright by assignment, bequest, or other transfer of rights. [20]

The scope of the prohibition against copyright protection for government works aroused controversy during the revision of the 1909 Act. The Register's 1961 Report recommended that copyright in government works be permitted in exceptional cases, and this proposal was carried over into the 1963 draft and the 1964 revision bill.

In the 1961 Report, the Register recommended that "[a] central Government agency should be empowered to authorize exceptions to the general prohibition in special cases, and to authorize the exclusive licensing or transfer of Government-owned copyrights." [21]

The Register's recommendation sparked interest and debate in the panel discussions and subsequent revision bills. Several agencies stated that there were circumstances where it would be highly desirable to permit

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copyrighted. See H.R. Rep. No. 94-1476, 94th Cong., 2d Sess. 59-60 (1976) ["House Report"].

18 House Report at 58.

19 See note 4, supra.

20 17 U.S.C. §105. See Schnapper v. Foley, 667 F.2d 102 (D.C. Cir. 1981), cert. denied, 455 U.S. 948 (1982). (Government can obtain assignment of works produced under commission or grant from independent contractors who are not employees of government).

21 Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law, 87th Cong., 1st Sess. 133 (House Comm. Print, 1961).

copyright in works produced by their employees. Examples included: 1) Where the agency had special reasons to have a work published, 2) Where a work was the joint product of the agency and a private organization desiring copyright; 3) Where a work was produced by the agency under a grant from a private organization desiring copyright; 4) Where an agency sought to operate a self-supporting program for the publication of its research reports; and 5) Where the agency had reason to believe that reproduction of a publication must be controlled to prevent distortion in a dangerous manner. Numbers 4 and 5 were rejected during the panel discussions on copyright revision, but the validity of numbers 1-3 was acknowledged. [22]

Building upon the discussions of possible exceptions to the general ban on government copyright protection, section 4(c) of the 1964 Revision Bill contained the following provision:

> (c) In other exceptional cases, copyright may be secured in a published work of the United States Government where, because of the special nature of the work or the circumstances of its preparation, it is determined that copyright protection would result in more effective dissemination of the work or for other reasons would be in the public interest. The head of the Government agency for which the work was prepared shall make the determination in each case in accordance with regulations established by an administrative officer designated by the President, and shall publish a statement of the basis for its determination in each case in the manner specified by such regulations.

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22 See Discussion and Comments on Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law, 88th Cong., 1st Sess. 197-206 (Comm. Print 1963), Preliminary Draft for Revised U.S. Copyright Law and Discussion and Comments on the Draft, 89-105 (1964); Further Discussions and Comments on Preliminary Draft for Revised U.S. Copyright Law, 88th Cong., 2d Sess. 263-268 (Comm. Print 1964).

H.R. 4347, 89th Cong., 1st Sess. (1964).

Because of the added layer of bureaucracy for determining exceptions, this provision encountered resistance; however, the basic premise was accepted, that situations existed justifying copyright in government works.[23]

The 1965 Revision Bill eliminated the exception language for Government works. In his 1965 Report, the Register stated:

> In the light of the arguments for and against allowing copyright in Government works under exceptional circumstances, we undertook a further exploration of the actual need for exceptions and of the possibility of establishing effective administrative safeguards to ensure that the exceptions would not be abused. Our conclusions, based on the information we received, were that there are undoubtedly a few isolated cases in which copyright in a Government work would do no harm and might actually benefit the public, but that these cases are quite rare. On the other hand, to set up administrative machinery effective enough to prevent the granting of copyright to Government works in cases where it is not warranted would require extremely elaborate procedures and detailed safeguards. The few cases where copyright would be justified do not, we believe, warrant the establishment of these complex procedures, and we have therefore dropped the provision allowing exceptions from the bill. [24]

Thus, after extensive public debate, the Register's proposals were dropped in the 1965 bill, and thereafter. [25] The proposals had been

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23 See, 1964 Revision Bill With Discussions and Comments, 89th Cong., 1st Sess. 43-56 (Comm. Print 1965).

24 Supplementary Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law, 89th Cong., 1st Sess. 10 (Comm. Print 1965).

25 Second Supplementary Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law: 1975 Revision Bill, (draft) 94th Cong., 1st Sess. 11 (1975).

supported by some government agencies and a few book publishers, primarily on the ground that some government works would be given broader and more effective dissemination through commercial channels, and that the public interest would therefore be served by allowing copyright to be claimed in them. The recommendation was strenuously opposed by newspaper and periodical publishers, among others, on the ground that a provision allowing exceptions would be unnecessary and open to abuse. [26]

In 1975, the National Aeronautics and Space Administration (NASA) proposed an amendment which would have allowed copyright to be secured in a government produced work where, because of the nature of the work or the circumstances of its preparation, it was determined that copyright protection would result in more effective dissemination of the work, or, for other reasons, would be in the public interest. Under this proposal the head of the agency for which the work was prepared would determine on a case-by-case basis whether a work should receive protection, and would publish a statement explaining each decision. Congress did not adopt this suggestion.

The broad language of the 1976 Act's legislative history, allowing copyright in works created by federal contractors, all but subsumes the general rule prohibiting government copyright. The House Report states:

> A more difficult and far reaching problem is whether the definition (of a Government work) should be broadened to prohibit copyright in works prepared under U.S. Government contract or grant. As the bill is written, the Government agency concerned could determine in each case whether to allow an independent contractor or grantee to secure

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26 Supplementary Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law, 89th Cong., 1st Sess. 10 (1965).

> copyright in works prepared in whole or in part with the use of Government funds....
>
> The bill deliberately avoids making any sort of outright, unqualified prohibition against copyright in works prepared under Government contract or grant. There may well be cases where it would be in the public interest to deny copyright in the writings generated by Government research contracts and the like; it can be assumed that, where a Government agency commissions a work for its own use merely as an alternative to having one of its employees prepare the work, the right to secure a private copyright would be withheld. However, there are almost certainly many other cases where the denial of copyright protection would be unfair or would hamper the production and publication of important works. Where, under the particular circumstances, Congress or the agency involved finds that the need to have a work freely available outweighs the need of the private author to secure copyright, the problem can be dealt with by specific legislation, agency regulations, or contractual restrictions. [27]

Section 105 was enacted to give the public unlimited access to important information, and to prevent the government from exercising censorship. There is a general policy goal of maximizing public access to information essential to an informed populace.

Another basis for restricting copyright in works created by government employees is the so-called "double subsidy" argument: the public pays for the creation of the work once through taxes, and should not have to pay a second time through copyright royalties. [28]

In any intellectual property transaction between the United States government and a private contracting party, the government's need for access

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27 House Report at 59.

28 Id.

to and use of copyrighted works, particularly computer programs and data, is balanced against the rights of commercial producers of the material. In the area of defense procurement, for example, the government's needs are especially urgent, often requiring ownership and control over classified or top secret software and data. As a matter of contract law, the government may demand that a contractor preparing a work transfer certain rights to the government as a condition of doing business. [29] Whether an assignment-back of rights is valid has not been definitely settled under the existing copyright law, however.

6. Caselaw.

The most significant recent case interpreting section 105 of the 1976 Act is Schnapper v. Foley, 667 F.2d 102 (D.C. Cir. 1981), which involved an action for declaratory relief brought to invalidate the copyright in a series of films about the United States Supreme Court. The films were to be produced by a private independent contractor with the Administrative Office of the United States Courts, with the copyright initially owned by the private party. The contract provided, however, for a later copyright transfer to the U.S. Government.

The contractor argued that the 1976 Act (as well as the 1909 Act) did not permit registration of works commissioned by the Government or the subsequent assignment of such works to the Government.

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29 See Schnapper v. Foley, 667 F.2d 102 (D.C. Cir. 1981), cert. denied, 455 U.S. 948 (1982).

The District of Columbia Circuit disagreed on the issue of contractor created works, stating: "[i]t is readily observable, therefore, that the language of the new Copyright Act does not prohibit copyright protection for federally commissioned works." [30]

The court also rejected the contractor's argument that the commissioning of the work and later assignment back to the government were intended to bypass section 105:

> Without laying down a broad rule, we are reluctant to cabin the discretion of government agencies to arrange ownership and publication rights with private contractors absent some reasonable showing of a congressional desire to do so. The legislative history noted above indicates a desire to vest the government with some flexibility in making these arrangements. The House Report provides no strong indicia of congressional intent that would lead this court to void the alleged assignment provision.... Section 105, therefore, is not necessarily subverted by assigning to the Government the copyright in a commissioned work that is neither produced by current or former employees nor related to the official duties of any Government employee, as here. Had the Government employees been detailed as consultants or employees of [the independent contractor], we might more readily find the purported assignment to be a 'subterfuge,' but without any such allegation we simply lack the statutory warrant to void the assignment.[31]

Professor Nimmer subsequently criticized the Schnapper decision based on the very fact that the contract involved in the case contained an assignment clause to the government. He reasoned that this was evidence that the parties were attempting to subvert section 105. [32] It is, entirely

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30 667 F.2d at 108.

31 Id. at 109.

32 1 Nimmer, Nimmer on Copyright, §5.06[B][3] n. 23.1.

possible that another court addressing the assignment issue would not follow Schnapper.

Conclusion

The issue of copyright protection for federally produced works is not new. It was considered during the 1976 Act revision process, and is before us again today. Until now, the primacy of widespread dissemination of government works has prevented the federal government from copyrighting computer software. However, the time seems ripe for a change. There is a viable argument that these works, in addition to being commercially valuable, are essential to national security and defense interests, distinguishing them from more traditional endeavors, such as books and paintings.

H.R. 191 is an acceptable balancing of the respective needs of the federal government and private sector. However, because the bill affects two key provisions of the Copyright Act -- sections 105 and 201(b) -- we have a slight preference for amending the copyright law to avoid conflicting interpretations with technology transfer law.

Historically, the government copyright prohibition was based on democratic notions of open government. But copyright covers works of immense economic value, and in today's highly competitive global economy this policy may be in conflict with U.S.international interests.

The Copyright Office supports the principle of the bill. We would request, however, that the definition of government agencies include legislative branch agencies in order to protect any cooperatively developed

software. I recommend an amendment of H.R. 191 to make clear that the phrase "Federal agency" includes legislative branch agencies, for these purposes.

I commend this Subcommittee for its diligence in studying the scope of protection for federally produced works. The Copyright Office will provide whatever assistance is requested in furtherance of this effort.

Mr. THORNTON. Thank you, Ms. Schrader.

We're going to go down the table. Mr. Chandler—Dr. Chandler, I should say.

STATEMENT OF JAMES CHANDLER, NATIONAL LAW CENTER, GEORGE WASHINGTON UNIVERSITY, WASHINGTON, D.C.

Dr. CHANDLER. Thank you, Mr. Chairman and members of the committee, for the invitation to come today.

I think that what I would like to do is begin with the broader question that Mr. Henry raised, which is the balance between free society and one in which we control information more particularly.

The policy of keeping the Government from copyrighting materials was a sound policy when it was developed, but the American people invented something that didn't exist when that policy was adopted, and that is the information age. At the time that policy was adopted, there was not commerce in information, but there is commerce in information today. All the testimony we've heard has indicated that there is great commercial value in computer software. And as a result, we need to find a way to protect this commercially valuable subject matter while at the same time preserving on the other side the values of the first amendment, or free expression.

We have, as the chairman pointed out, the wisdom of the founding fathers in putting in article 1, section 8, clause 8, and they balanced that against the first amendment. So there is a responsibility to go forward and protect commercially valuable ideas and information while at the same time preserving the values of the first amendment. And the two can coexist. I think that Congresswoman Morella's bill is a significant contribution to this.

[Laughter.]

Mrs. MORELLA. Talk about timing.

[Laughter.]

Mr. THORNTON. She knew you were going to refer to her in a complimentary way and so came back from her vote when—

Mrs. MORELLA. That's right.

Dr. CHANDLER. I'm delighted that she did so—achieves a significant and very important balance between the two.

Now because of the openness of our society, we have suffered tremendous financial losses over the last few decades.

So what I would like to do is point some of these out if I may.

Mr. THORNTON. Please do so in a summary way. And as I have told all of the witnesses, your entire prepared testimony will be made a part of this record, and we will have all of that detail. And thank you for the way you're beginning, Dr. Chandler. I really appreciate the way you're addressing the issues right off the mark.

Dr. CHANDLER. Thank you, sir, and I don't have very much to say today.

[Laughter.]

Dr. CHANDLER. Computer software, which is developed by the Government laboratories—Government owned and Government operated laboratories—falls into the public domain. What does this mean? It means that the software is free to every American, it's free to every foreign company, it's free to every foreign govern-

ment. And I have had the opportunity to travel to some of the national laboratories to study the question a little and I've learned that we make it easy for all of those people to get it free because we collect it all—we've established several libraries in the country—just a half a dozen or so—and we require all of these laboratories to ship all of their software to these libraries.

So if you're a foreign company or a foreign government, all you have to do is come to these libraries and request it and you pay the cost of reproduction and you get it. So we have lost billions of dollars of software. Indeed, in my investigation, 48 percent of all of the requests that these libraries get for software comes from the Japanese, about 25 percent—24 point something—comes from the Germans, and the United States gets less than 24 percent.

Now, as Secretary White pointed out, it is sold back to Americans. So Americans pay first to develop it, and they're taxed by our Government to pay for that.

Mr. THORNTON. You started meddling when you started talking about taxes.

[Laughter.]

Dr. CHANDLER. But it goes out of the country and it is sold back to American businesses which in turn taxes the consumer when those products are sold to the Government—I mean to the public—the American consumer pays again. It seems to me that Congresswoman Morella's bill will close the door on a part of that. We should close the whole door, but this is certainly an important step in the right direction.

Now the difference between—I heard the chairman ask about the distinction between books and software, and I think it's consistent with the inquiry made by Mr. Henry. The difference between a book as a valuable book is in reading it. When you have read the book, you have experienced the value, the contribution the book is intended to make. But software value lies in its utility, its ability to be used in a commercial enterprise. And because it is a utilitarian product with great commercial value, it has to be treated differently from a book.

I think that the committee is headed in the right direction by making it so, but I think there is a lot more work to be done not only with Government developed software but with software which is developed in the private sector as well.

The committee inquired of us on five specific points, and I have one comment briefly on each.

Will the CRADA mechanism block public access to already existing federally generated computer software? This goes to Mr. Henry's question on Ashton-Tate and the chairman's question that followed up on that. Once the software is in the public domain, it is in the public domain and anyone can use it. The reason the American private industry doesn't want to use it is that once it's in the public domain and anyone can use it, they only own their enhancements to the software.

In a recent case by the D.C. Circuit Court of Appeals, United States versus INSLAW, the court held that the commercializer of the software only owned the enhancements.

Now what is the value of an enhancement to a computer program? Who would buy an enhancement to a computer program?

The value of it is when it is all together as an operating system. If you can't take it out of the public domain, then of course it is of substantially diminished value.

But I think that weighing against the question of whether or not we want to standardize the inputs or standardize the outputs is the question of whether or not we want to commercialize the software for the benefit of the American society, or whether we want to keep the door open so that others can take it. But my answer to the question, number one, is no.

The second question, should copyright protection be extended to computer software that is federally generated outside the scope of the CRADA? I think eventually we should, but I think that Congresswoman Morella's bill is directly on target at the beginning point.

With respect to question number three, will the CRADA mechanism be a sufficient incentive to Federal employees? If you—I have—as a theory of property, the Government— I've heard the argument made that the Government should go out and license software without a copyright. The fact of the matter is, a license is a conveyance of an interest in property. And if the Government goes out and licenses software which it doesn't own, it's probably like an individual that conveys the Empire State Building without owning it. You can't do that.

Mr. THORNTON. You'd better give a quick claim deed rather than—

[Laughter.]

Dr. CHANDLER. So what Congresswoman Morella's bill does is to vest in the Government a property interest which the Government is capable of conveying, so that the Government can legitimately create a property interest in a transfer rating or a private industry that wants to commercialize a product. The Government should not be in the business of licensing software it doesn't own. And once it goes into the public domain, Mr. Henry, Congressman Henry, it's gone, it is out of the reach of the Government. And the Government should not be in the business of attempting to license that information, that software.

Question number four, Is there a mechanism by which preexisting federally generated software can be brought under the CRADA umbrella? If the Congress chooses to make legislation retrospective in effect, it has the constitutional power to do so. I am certainly not advising that that be done, and Congresswoman Morella's bill doesn't provide for that to be done. I think her bill is sound the way it is presented.

With question number five, If a Federal copyright is provided, what software should be included? Ultimately, I think that all commercially valuable software should be protected. Congresswoman Morella's bill doesn't reach those. It reaches only the CRADA context of software. I think it's an appropriate beginning, but I would urge the committee to proceed to cover it all.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Chandler follows:]

TESTIMONY

OF

JAMES P. CHANDLER, SR.
PROFESSOR OF LAW
NATIONAL LAW CENTER, GEORGE WASHINGTON UNIVERSITY
WASHINGTON, D.C.

AT THE

HEARING ON COPYRIGHT PROTECTION FOR COMPUTER SOFTWARE
TO ENHANCE TECHNOLOGY TRANSFER

BEFORE THE

SUBCOMMITTEE ON TECHNOLOGY AND COMPETITIVENESS

OF THE

THE COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

OF THE

UNITED STATES HOUSE OF REPRESENTATIVES

WASHINGTON, D.C.

JULY 18, 1991

I. INTRODUCTION

The United States is a global leader in the production of computer software and other new technologies. Yet the United States government and its Multinational enterprises are losing billions of dollars annually due to the loss of valuable intellectual property assets to foreign competitors in industrial, developing-industrial and lesser-developed countries. These losses of U.S. intellectual property assets has the over-arching effect of eroding the future of United States competitiveness and trade, and tend to undermine the U.S. economy.

"The goal of United States technology policy", however, wrote Dr. D. Allan Bromley, Director of the President's Office of Science and Technology Policy (OSTA), "is to make the best use of technology in achieving the national goals of improved quality of life for all Americans, continued economic growth, and national security." Among the means chosen by OSTA for implementation of this policy, include:

1. Improvement of "opportunities for companies to commercialize technologies and computer software developed during the performance of government contracts by allowing the contractors to retain rights in technical data," which includes computer software, "and by protecting their trade secrets."
2. "Seek better international protection of intellectu al property to allow more benefits to be recovered from

R&D investments."[1]

In furtherance of these policies, James Massey, a negoitiator for the United States Trade Representative, informed the People's Republic of China that their recently enacted copyright law is defective because it fails to adequately protect software which is developed in the United States. The current Chinese law protects new software but is defective because it does not protect existing software. Existing software would be exposed to continued piracy. (see Asian Wall Street Journal Weekly, June 24, 1991).

The proposed legislation of Representative Constance Morella introduced on January 3, 1991 as HR 191 is entirely compatible with the expressions of national policy by Dr. Bromley and the actions of the United States Trade Representative in China. Her bill is calculated to achieve two important objectives: First, Section 3 of the bill will promote the development of computer software technology in Government owned and Government operated National Laboratories. And, second, Section 2 of the bill will protect computer software as an intellectual property asset of the United States which will thereby facilitate its transfer to private industry for commercialization under exclusive license agreements.

HR 191 will inspire increased production of software creations by rewarding the authors and inventors of computer software technology with a share of the royalties which are paid in when the software is commercialized. The bill also provides an incentive for

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[1] See, Letter dated September 26, 1990 from Dr. Bromley to Senator Robert Byrd and Congressman Jamie L. Whitten.

the development of software that will have a commercial value. For there is no reward of money to the software author unless the software has commercial value. So the Bill places a premium upon the development of commercially valuable software. This Section 3, also places a premium upon getting the software technology transferred out of the federal laboratories into the private sector for exploitation. This is correct property theory too for this policy will have the inevitable effect of stabilizing this sector of the computer industry and return to the American taxpayer some benefit in the form of industrial growth at home, increased job opportunities in the private sector and a diminished tax burden arising from the return of royalties to the laboratories. In the UNITED STATES of America v. INSLAW, INC.[2] case the Court of Appeals for the D.C. Circuit held that Inslaw which had commercialized software which it had first developed as a non-profit researcher with public funds could only claim and protect as its own that software which it had actually developed by way of enhancement of the public domain software. Thus, computer software which has been placed into the public domain by existing law may not be taken out of the public domain by a private company even though that company may have invested large sums of money in the commercialization of the software. Congresswoman Morella's bill would remove this impediment to private ownership of governmentally developed software and remove this barrier to its commercialization. The proposed legislation therefore advances the policy of Stevenson-Wydler by taking another step in the direction of improving the

[2] 932 F.2d 1467 (D.C.Circuit, May 7, 1991)

transferability of computer software technologies into the private sector and thereby strengthens the competitive position of American industry.

And, Mr. Chairman, we should remember that there are only two ways to reward these scientists and thereby stimulate further authorship and inventions of computer software technology which has commercial value. The first way is for Congress to tax someone else and pay the proceeds to these scientists as a cash award for their creativity. The problem with this system is that it does not have a way to keep score on what the reward should be or how much the reward should be. Such an approach is anti-competitive and would fail to stimulate because it carries the great risk of rewarding the wrong persons in the wrong amounts. Such a process would be overcome by factors other than merit and would be unfair to those upon whom such a tax would be imposed. The Second way is create a property system for computer software by allowing government copyright of software technology. The market place would then decide whether there would be a reward to the inventor or author and would also decide how much that reward will be, and both would serve to stimulate invention and commercialization. Hence an intellectual property system is merely a reward system, it is a meritorious method of keeping score. It is for this reason that the United States Trade Representative's position with China that both new and existing software must be protected under their new copyright law is correct. This country should do no less with respect to computer software which is authored or invented by federal employees in their work under cooperative research and

development agreements.

On commercialization U.S. Government copyright would be a god sent to the small and medium sized companies because of the valuable exclusive license which they would recieve which in turn would enable the licensee to rely upon the faith of the goverment's title in making further investments in the software and defending it against others such as the Chinese or other foreign countries or companies which might otherwise seek to exploit the technology if it were placed into the public domain.

The fear of exploitation by others is not a vain fear. For while the United States and its multinational companies owned in 1990 an estimated sixty per cent of the world wide market in computer hardware and some seventy per cent of the software market, a sober warning came out of Silicon Valley on June 17, 1991. David Kirkpatrick, Chief Technologist at Hewlett-Packard,[3] wrote that: "When we," the United States, "look down the road, we see the possibility of losing ground rapidly and completely."

The ITC estimated in 1982 that in five selected industrial sectors, piracy of U.S. intellectual property rights cost the nation's businesses $5.5 billion in annual sales and cost Americans 131,000 jobs.[4] In 1987, estimated worldwide losses to U.S. industries as a result of inadequate, intellectual property protection were $23.8 billion.[5] Between 1956 and 1978 Japan paid

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[3] "Who's Winning The Computer Race," by David Kirkpatrick, Fortune Magazine, June 17, 1991, page 58.

[4] Senator Lantenberg, 133 Cong. Rec. 19444-45 (1987).

[5] Representative Moorhead, 134 Cong. Rec. 8117 (1988).

$9 Billion for technology which cost the United States $500 Billion to $1 Trillion to develop.[6] China is also a major offender. There were 11,800 instances of piracy discovered in China in 1989.[7] The United States cannot continue to sustain these kinds of losses and remain competitive. The Morella Bill does not stop all of the leaks in the system of intellectual property laws that permit the loss of American scientific and technological technical data, but it will close one of the loopholes. And that is an improvement.

II. THE UNITED STATES TECHNOLOGY TRANSFER POLICY

It is the national policy of the United States to protect the intellectual property assets of the nation in both the public and private and public sectors of the economy. No where is this policy more clearly stated than in the Federal Transfer of Technology Act (FTTA) which of course was not the first law designed by Congress to improve technology transfer. One of the first such laws enacted by Congress which fostered protection of the intellectual assets of the nation and encouraged technology transfer from public laboratories to private industry, was the Bayh-Dole Patent and Trademark Amendments of 1980.[8] The Bayh-Dole legislation gave non-profit organizations, primarily universities, and small businesses rights to inventions made under Federal grants and contracts. As initially enacted, the Bayh-Dole amendments fell short in that it

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[6] Harvard Business Review, March-April 1991.

[7] Office of the United States Trade Representative

[8] P.L. 96-517, 97 Stat. 3015, codified at 35 U.S.C. 301 et seq. (1982).

did not apply to Federal laboratories. In 1984, however, Congress extended the patent and trademark policy to include Federal laboratories operated by universities and non-profit corporations.[9]

Also in 1980, Congress enacted the Stevenson-Wydler Technology Innovation Act of 1980 ("Stevenson-Wydler").[10] Stevenson-Wydler made the attainment of the goal of transfer of federally developed technology to private industry, to States, and to local governments a national policy and it imposed the duty to carry out this mission upon each of the national laboratories. Stevenson-Wydler stimulated the creation of the offices of Research and Technology Applications ["ORTA"] in the larger Federal laboratories. The ORTA's were tasked to evaluate new technologies, to promote the transfer of commercially valuable technologies to industry. They also were to make laboratory resources more eadily available to the private sector. The second significant achievement of Stevenson-Wydler was the establishment of a clearinghouse for information on Federal inventions.[11]

A major criticism of Stevenson-Wydler however was the lack of a clear legislative mandate for Federal laboratories to enter into cooperative research agreements with the private sector. Furthermore, Stevenson-Wydler also lacked sufficient incentive for Government employees to disclose their inventions which could have

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[9] P.L. 98-620, 98 Stat. 3335, codified at 15 U.S.C. 1051.

[10] P.L. 96-480, 94 Stat. 2311, codified at 15 U.S.C. 3701 et seq.

[11] This clearinghouse is referred to as the Center for the Utilization of Federal Technology. The Center is opeated by the Department of Commerce and is part of the National Technical Information Service ["NTIS"].

Government-wide benefits. The inadequacies of the legislation, lead Congress to revisit Stevenson-Wydler in early 1985.

Legislative History of the FTTA

In 1985, two bills were proposed to supplement Stevenson-Wydler.[12] Following these two bills, the Subcommittee on Science, Research and Technology in the House and the Subcommittee on Science, Technology and Space in the Senate conducted hearings on technology transfer.[13]

One of the recurring issues raised in the testimony given at these hearings was that the Congress should improve the management of the intellectual property assets developed by the government.[14] For example, the Assistant Secretary for Productivity, Technology and Innovation at the U.S. Department of Commerce, Dr. D. Bruce Merrifield, testified that improved intellectual property asset control is necessary because "without control of access to the new

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[12] These bills were H.R. 695, which was introduced by Congressman Michel, and H.R. 1572, which was introduced by Congressman Lundine.

[13] See, New Technologies on Economic Competitiveness: Hearings Before the Subcom. on Science, Technology and Space of the Senate Comm. on Commerce, Science and Transportation, 99th Cong., 1st Sess. 1, S. Hrg. 99233 (1985); and Technology Transfer: Hearings Before the Subcomm. on Science, Research and Technology of the House Comm. on Science and Technology, 99th Cong., 1st Sess., No. 22 (1985).

[14] Generally speaking, the Federal laboratories undertake technology transfer in one of four ways. The first is by providing information such as advice, technical assistance, reports, and other forms of aid. Another type of transfer of technology occurs with interchange or exchange of laboratory personnel. Similarly, laboratories often share research facilities and equipment. The fourt way of transferring technology is through the concept of intellectual property rights, which includes patents, copyrights, technical data, and trade secrets.

technology, there is a high risk that capital invested in the innovation will not be recovered and become profitable before others, who do not have to replicate the original development cost, copy the product and become competitors."[15] Thus, concluded Dr. Merrifield, the "most significant opportunity for improving the transfer of technology generated by Federal laboratories to the economy and the competitive position of the United States lies in the area of improving intellectual property management."[16]

While the discussion concerning intellectual property focused primarily upon patents all forms of intellectual property assets were considered from technical data to patents. The testimony urged the House subcommittee to enact authority for the laboratories to grant exclusive licenses to patents in order to foster technology transfer.[17]

The most extensive testimony on the subject of the need to protect the intellectual property assets of our nation came from the President of AT&T Bell Laboratories, Ian M. Ross. Mr. Ross offered the following testimony:

> ....[G]iven the importance of technological innovation, it is not enough to simply nurture creativity and even apply it effectively. We must safeguard our innovations through the adequate protection of intellectual property rights at home and abroad. Such protection encourages new product and process development in both high-technology and basic industries.

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[15] See, Statement of Dr. D. Bruce Merrifield, House hearings on Technology Transfer, note 13, supra, at 21.

[16] Id.

[17] See, Statement of Dr. Eugene E. Stark, Jr., Chairman of the Federal Laboratory Consortium for Technology Transfer, House Hearing on Technology Transfer, Note 13, supra, at 106, 140.

> To an alarming degree, intellectual property rights have already begun to erode. This is a result of problems that include inadequate or nonexistent patent protection, rampant commercial counterfeiting, copyright and design infringements, and improper use of the Freedom of Information Act. Increasingly, American firms are being denied the benefits of their own inventions.
>
> As intellectual property and innovation have become ever more complex and varied, our U.S. system often responds too slowly to the newest ideas and greatest advances in knowledge, such as biotechnology and semiconductor chips. We must not only rethink our entire body of intellectual property law, but move quickly and immediately to improve the present system to afford full protection to all forms of intellectual property. [Emphasis added.][18]

Both the Senate and the House passed bills on December 9, 1985 to amend Stevenson-Wydler.[19] The Senate and the House both agreed on the Conference Report,[20] and on October 20, 1986, President Reagan signed P.L. 99-502, today known as the FTTA.

Substantive Provisions of the FTTA

The FTTA made a number of substantive changes to Stevenson-Wydler. The significant provisions of the FTTA can be summarized as follows:

1. Provides for the first time funds for the Federal

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[18] See, Statement of Ian M. Ross at the Senate Hearing on Technology Transfer, Note 13, supra, at 124-125.

[19] The Senate passed S. 1914 and the House passed H.R. 3773. Both bills were referred to the Senate Committee on Commerce, Science, and Transportation.

[20] The Senate and House agreed to the Conference Report on october 3, 1986 and October 7, 1986 respectively. See, Cong. Rec. S 15131 (daily ed. October 3, 1986), and Cong. Rec. H 9399 (daily ed. October 7, 1986).

Laboratory Consortium;[21]

2. Requires Federal laboratories to establish research and technical applications offices;[22]

3. Makes technology transfer the responsibility of every Federal laboratory, scientist engineer, and technician;[23]

4. Directs agencies to institute a cash awards program;[24]

5. Authorizes Federal laboratory directors to enter into cooperative research and development agreements and to license, assign or waive rights to Government-owned intellectual property rights;[25] and

6. Allows Government patents to earn royalties.[26]

Although these changes will undoubtedly improve the transfer of patentable technologies, such as computer hardware, the FTTA offers little, by the way of improvement, to foster the transfer of computer software technology. For example, Section 2(10) of the FTTA states that the Congressional finding that "[t]he Federal laboratories and other performers of federally funded research and development frequently provide scientific and technological developments of poten-

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[21] P.L. 99-502, Section 10(e).

[22] P.L. 99-502, Section 10(b).

[23] P.L. 99-502, Section 10(a)(2).

[24] P.L. 99-502, Section 12.

[25] P.L. 99-502, Section 11(a) & (b).

[26] P.L. 99-502, Section 13.

tial use to State and local governments and private industry." Section 2(10) then states that "[t]hese developments, which include inventions, computer software, and training technologies, should be made accessible to those governments and industry" [Emphasis added]. Lastly, Section 2(10) declares that "[t]here is a need to provide means of access and to give adequate personnel and funding support to these means." Just what the "means of access" are, for transferring computer software technology, is the question left unanswered by the FTTA.

Likewise, Section 3 provides that one of the purposes of the FTTA is to improve the economic, environmental, and social well-being of the United States by "stimulating improved utilization of federally funded technology developments, including inventions, software, and training technologies, by State and local governments and the private sector" [Emphasis added]. Although Section 4 of the FTTA defines the term "invention" and "training technology," no definition is provided for either the term "computer software" or "software."

Also lacking is any clearly defined guidance in Section 10 which establishes the federal technology transfer policy.[27] The language in the FTTA is of particular interest

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[27] Section 10(1) of P.L. 99-502 states:

> It is the continuing responsibility of the Federal Government to ensure the full use of the results of the Nation's Federal investment in research and development. To this end the Federal Government shall strive where appropriate to transfer federally owned or originated technology to State and local

in that it amounts to a statutory recognition that the federal copyright law[28] might be a "barrier" which would restrict or limit computer software from being readily transferred to the private sector for commercialization. Thus, it may be fairly stated that the FTTA on its face falls short of the mark of providing clear authority and a clear mandate for the transfer of computer software technology to private industry or to State and local governments. For it is a settled principle in the law of property that the government cannot transfer property interests which it does not own. Hence anyone in industry should be reluctant to accept the purported transfer of such unowned property from the national government.

Section 11 of the FTTA provides general authority for the director of any government-operated[29] Federal laboratories to enter into cooperative research and development agreements,[30] and to negotiate licensing agreements for

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governments and to the private sector.

[28] See, e.g., 17 U.S.C. 105 (1982).

[29] This term should be distinguished from the term Government-owned, Contractor-operated, or "Go-Co."

[30] Section 11(d) defines the term "cooperative research and development agreement" as follows:

> any agreement between one or more Federal laboratories and one or more non-Federal parties under which the Government, through its laboratories, provides personnel, services, facilities, equipment, or other resources with or without reimbursement (but not funds to non-Federal parties) and the non-Federal parties provide funds, personnel, services, facilities, equipment, or other resources toward the conduct of specified research

Government-owned inventions. But how can the Government transfer ownership of software which it does not known. CRADA software is in the public domain meaning that the Government does not own it. Likewise how can the Government contract to license software which it does not own. The Government cannot legally transfer or license property which it does not own. To make a legally effective transfer or license of computer software the Government must own the copyright.

Section 11 of the FTTA covers patentable technologies only.[31] Other language in the Act suggests that the entire FTTA is applicable to patentable technologies. Illustrative of this point is Section 13 of the FTTA which establishes a program for the distribution of royalty income associated with the "licensing or assignment of inventions" under cooperative research and development agreements. Furthermore, Section 14 allows the Government employee or former employee the opportunity to retain title to the invention if the Federal agency "does not intend to file for a patent application or otherwise promote commercialization of such invention." There is no comparable provision for Government

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or development efforts which are consistent with the missions of the laboratory; except that such term does not include a procurement contract or cooperative agreement as those terms are used in sections 6303, 6304, and 6305 of title 31, United States Code.

[31] Section 4(9) defines the term "invention" as "any invention or discovery which is or may be patentable or otherwise protected under title 35, United States Code, or any novel variety of plant which is or may be protectable under the Plant Variety Protection Act (7 U.S.C. 2321 et seq.)."

employees who create computer software. It is imperative that this ommission be corrected.

Executive Order 12591

On April 10, 1987, approximately seven months after he signed into law P.L. 99-502, President Reagan issued Executive Order 12591, entitled "Facilitating Access to Science and Technology."[32] The Executive Order contains seven directives which are designed to ensure that Federal agencies and laboratories assist universities and private sector in broadening the technology base of the United States by moving new knowledge from the research laboratory into the development of new products and processes.

With respect to Federal technology transfer policy, the Executive Order directs each Executive department or agency to delegate authority to its government-owned, government-

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[32] In a statement released with Exec. Order No. 12591, President Reagan noted:

> I believe a vigorous science and technology enterprise involving the private sector is essential to our economic and national security as we approach the 21st century. Accordingly, I have today issued an Executive Order "Facilitating Access to Science and Technology."
>
> It is important not only to ensure that we maintain American preeminence in generating new technology and know-how in advanced technologies, but also that we encourage the swiftest possible transfer of federally developed science and technology to the private sector. All of the provisions of this Executive Order are designed to keep the United States on the leading edge of international competition.

operated[33] Federal laboratories, State and local governments, universities, and the private sector by entering into cooperative research and development agreements in which rights to intellectual property developed by the laboratory can be licensed, assigned or waived.[34] This Executive Order cannot be fully implemented until Congress amends the law to allow copyright of Government owned computer software. The Executive Order also requires the Office of Federal Procurement Policy to issue policy guidance in developing a uniform policy permitting Federal contrctors to retain rights to software, engineering drawings, and other technical data generated by Federal grants and contracts, in exchange for royalty-free use by or on behalf of the government.[35] Congressional authorization of agencies to copyright software is required for full implementation of this aspect of Presidential Executive Order 12591.

III. PRACTICAL PROBLEMS ASSOCIATED WITH THE TRANSFER OF COMPUTER SOFTWARE TECHNOLOGY

In theory, the FTTA's goal of stimulating the industrial base of the United States by the transfer of technology from

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[33] It should be noted that this delegation directive is limited to only government-owned, government operated, or GO-GO, Federal laboratories. Consequently, those government-owned, contractor-operated, or GO-GO, laboratories are outside the scope of this Executive Order.

[34] See, Exec. Order No. 12591, Secton 1(b)(1)(A) & (B), dated April 10, 1987, entitled "Facilitating Access to Science and Technology."

[35] Id. at Section 1(b)(6).

the Federal laboratories to the private sector, is admirable. In practice, however, there are a number of constraints which make the transfer of computer software technology practically impossible.

The major limitation impeding the free transfer of computer softwasre technology is the unavailability of legal protection for any federal government work.[36] The general prohibition against copyright protection applies to "any work of the United States Government."[37] The intent of this prohibition is to place all works of the United States Government, published or unpublished, into the public domain. Copyright protection is an important incentivve to the creation and dissemination of new computer software technologies.

Patent protection for computer software is not available unless it is a part of an otherwise patentable machine or process.[38] Copyright protection is the principal means of

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[36] See, e.g., 17 U.S.C. 105 (1982) which states that "[c]opyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest or otherwise."

[37] The term "any work of the United States Government," is defined at 17 U.S.C. 101 (1982) as "a work prepared by an officer or employee of the United States Government as part of that person's official duties." Thus a Government official or employee would not be prevented from securing copyright protection in a work written at the person's own volition and outside his or her official duties, even though the subject matter involves the Government work or professional field of the official or employee.

[38] See, e.g., Bryan, Robert M. & Conley, John M., A Unifying Theory For the Litigation of Computer Software Copyright Cases, Computer L.J., Vol. VI, No. 1, 1985, at 55, 62.

protecting a company's investment in the development of a computer software product.[39] Since the Government too would have difficulty obtaining a patent for a majority of the computer software it develops, it likewise would have to rely on copyright as the means of protecting its investment. Until recently, the Government has not really given much consideration to "protecting its proprietary interests." However, to preserve the United States as an independent nation, the Government must protect its intellectual property assets for only then will it be able to give some assurance to the private sector transferees to whom the software is transferred, that their financial investment in commercialization of the product will be adequately protected. The best way to provide this assurance is to assign or otherwise transfer to private industry an exclusive right to practice the art in the form of a copyright interest in the software. This is not possible under existing copyright law.

For much the same reasons as above stated for copyright protection, the Federal Government does not have available to it the protection afforded by state trade secret law. The concept of a Federal trade secret is contradictory to the

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[39] See, Chandler, James P., Proprietary Protection of Computer Software, University of Baltimore Law Review, Vol. 11, No. 2, Winter 1982. And see, Brooks, Daniel Y., & Keplinger, Michael S., Computer Programs & Data Bases: Perfecting, Protecting & Licensing Proprietary Rights After the 1980 Copyright Amendments, Law & Business, Inc., (1981) at 419, 421. See also, P.L. 96-517, 94 Stat. 3028-3029, December 12, 1980.

underlying principal that the Government operates as a democracy.[40]

Another significant obstacle seen as frustrating the Federal government's ability to transfer computer software technology is the existence of public disclosure pursuant in the Freedom of Information Act ["FOIA"].[41] In the event agency records include the source code documntation, the Government would be compelled to release this information unless one of the statutory exemptions would prevent public dissemination. If however, the Federal Government could assign copyright or trade secret protection to a given software development to a commercial vendor, say for example pursuant to a cooperative research and development agreement, then the release of information pertaining to this innovation could be withheld under Exemption 4 of the FOIA.[42]

Along this same line, many fo the Executive agency's enabling legislation requires that the agency afford the widest practicable dissemination about its activities,

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[40] Since the Federal government operates for the benefit of the people, it arguably does not have a "financial" interest in any developmental technologies. There may exist a national security interest which requires protection against improper disclosure. This type of interest is quite dissimilar to a "business" or "financial" interest.

[41] See, P.L. 89-554, 80 Stat. 383, codified at 5 U.S.C. 552 (1982).

[42] 5 U.S.C. 552(b)(4) provides that the FOIA does not apply to "trade secrets and commercial or financial information obtained from person and privileged or confidential."

including technical data, which may include software.[43] Likewise, Governmntal agencies are required by law to deposit its developmental software with certain public domain software clearinghouses.[44] These laws coupled with the FOIa do not peacefully coincide with the underlying policy of the FTTA. In order to implement the FTTA, at least in terms of transferring computer software technology, these discordant policy considerations must some how be integrated.

In response to a request by the house Committee on Science, Space and Technology, the General Accounting Office ["GAO"] asked Federal laboratory and agency officials to identify constraints to transferring technology from federal laboratories to U.S. businesses. In a report dated March 4, 1988,[45] the GAO concluded that while recent changes in the law allow Federal laboratories to patent and exclusively license inventions, federal computer software is publicly disseminated therefore, private businesses do not have an

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[43] See, e.g., 42 U.S.C. 2473, which directs that the National Aeronautics and Space Administration to widely publicize information about NASA activities. See also, Department of Defense Directive No. 5400.7, dated March 20, 1980.

[44] For example, software is made available through GSA's Federal Software Exchange Center. See, Federal Information Resources Management Regulation ["FIRMR"] 201-31.014 et seq (1984 ed.). Also software is made available through the Commerce Department's National Technical Information Service ["NTIS"], the Energy Department's National Energy Software Center and the National Aeronuatics and Space Administration's Computer Software Management and Information Center.

[45] See, Briefing Report to the Chairman, Committee on Science, Space and Technology, House of Representatives, entitled Technology Transfer: Constraints Perceived by Federal Laboratory and Agency Officials, GAO/RCED-88-116BR, dated March 1988.

incentive to fully develop and market this technology. More specifically, the report finds that officials at 7 of the 10 Federal laboratories and 5 of the 6 Federal agencies interviewed stated that the technology transfer of computer software is constrained by specific legislation which requires Federal agencies to publicly disseminate computer software. GAO noted that the Patent and Trademark Amendments of 1980, as amended, authorizes Federal agencies to patent and exclusively license inventions and permit most contractor-operated Federal laboratories to elect to retain title to inventions that they make, however, that act does not address computer software, which is considered technical data and normally not patentable. The Federal officials interviewed recommended that Federal law be amended so that the transfer of computer software would be treated simialrly to federal inventions because: (1) no apparent reason exists for treating Federal laboratory inventions and computer software differently; (2) as with inventions, the most effective way to transfer computer software in many cases is to copyright it and then to exclusively license it to a software company; (3) federal employees who develop computer software do not have the same incentives to commercialize it as those who make patentable inventions because they cannot share in royalty income;[46] and (4) most Federal laws require public dissemination of computer software thereby affording foreign

[46] Recall that Section 13 of the FTTa establishes a royalty sharing program in whch the employee who makes an invention can receive a minimum of 15% of the royalties received by the agency.

business competitors equal access to the software.

IV. NEED FOR FURTHER LEGISLATIVE REFORMS

What then should Congress do in order to foster the transfer of computer technology? The first thing it should do is to pass H.R. 191. which was introduced by Congresswoman Morella on January 3, 1991. Congrssional authorization of copyright of computer software would dramatically improve the transferability of computer software technology to the private sector for commercialization for software developed under CRADA'S.

In addition Congress must reconcile the conflict between the policy of publicly disseminating computer software technology and the underlying policy of the FTTA which requires the transfer of computer technology which would improve the economic, environmental, and social well-being of the United States through private commercialization. Certainly the relative importance of the policy favoring commercialization of Federal technology, the impact of which has broad economic consequences, should be in parity with the interests of national defense or foreign policy.[47]

Further, Congress must recognize that the present state of the law of intellectual property, as it is applied to the Federal government, is inadequate, and therefore, cannot effectively accomplish the fundamental goal of the FTTA. This

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[47] See, e.g., 5 U.S.C. 552(b)(1) (1982) which exempts documents from release under the Freedom of Information Act which are classified in the interest of the national defense or foreign policy.

was the thrust of Dr. Merrifield's testimony when he called for improved "intellectual property management."[48] The wholesale recision of the present prohibition against a Federal copyright[49] is neither necessary or being advocated. What is necessary, however, is a clear exception to the copy right prohibition which would allow the Federal government to establish a copy right in certain original works of the United States Government. The determining factor whether a copyright should be issued to an original work of the United States Government should be tied, once again, to the need to foster commercialization of the subject of the copyright. As an added means of protection, the subject, of the copyright must be of sufficient technological importance that the denial of copyright protection would adversely affect the economic, environmental, or social well-being of the citizens of the United States. This need was recognized by Congresswoman Morella in her bill H.R. 191. For the current law allows the contractor operating a National laboratory to elect ownership to any intellectual property rights that can be established to protect technical data or computer software subject to a royalty free license to use and reproduce such technical data or computer software for United States Governmental purposes.[50] The Morella Bill would merely amend the FTTA to allow the Government-operated laboratory,

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[48] See note 15, supra.

[49] See note 34, supra.

[50] See, Cong. Rec. S 2059 (daily ed. March 4, 1988).

through its director, to elect intellectual property rights[51] which could then be transferred pursuant to a cooperative research and development agreement to private industry thereby providing the requisite degree of assurance demanded by the commercial enterprise investing capital into a cooperative research and development project.

Finally, there does not appear to be any legitimate reason why there should be a difference in application of intellectual property management policy for Federal laboratories depending upon whether they are contractor-operated, or government-operated. The underlying policy behind technology transfer does not differ if a laboratory is government or contractor operated. Consequently, the FTTA should be amended to reflect a national technology transfer policy and should not differentiate between who is operating the laboratory.

CONCLUSION

Congress has good reason to be concerned about the United States' ability to compete today's highly competitive and highly technological marketplace. The attempt by Congress in the FTTA to recognize the significance of technology transfer and its impact on industrial innovation, and hence the U.S. economy, is admirable and should be applauded. In doing so it must however be recognized that the

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[51] This term includes patents, trademarks, copyrights, trade secrets, mask works, and any other form of intellectual property enacted by Congress or the States.

FTTA stops short in fully authorizing the transference of all technologies which are vital to this nation's economic, environmental, and social well-being. The FTTA itself recognizes that there exists certain barriers which restrict the Government's ability to freely transfer computer software to the private sector. Quite simply, further legislation is needed to eliminate these barriers.

Legislation is now before Congress which would greatly improve the national Laboratory System's ability to transfer all types of technology, including technical data and computer software.

As stated by the President of AT&T Bell Laboratories, "[w]e must not only rethink our entire body of intellectual property law, but move quickly and immediately to improve the present system to afford full protection to all forms of intellectual property."[52]

Only the Congress can act to remove the barriers restricting transfer of federally funded computer software to the private sector, as contemplated by the congressional policy embodied in the FTTA.

Until such time as Congress acts, one can only hope that technological commercialization opportunities vital to this Nation are not lost.

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[52] See, note 18, supra.

Mr. THORNTON. Mr. Chandler, you have articulated in your last response a position that I personally believe to be a correct position, that we should be moving toward a broader application than the CRADA, but I do also appreciate your suggestion that some restraint might be appropriate at this moment in time.

Mr. Metalitz?

STATEMENT OF STEVE METALITZ, VICE PRESIDENT, AND COUNSEL, INFORMATION INDUSTRIES ASSOCIATION, WASHINGTON, D.C.

Mr. METALITZ. Thank you very much, Mr. Chairman and Members of the subcommittee. I am pleased to be here on behalf of the Information Industry Association to offer a broad industry perspective on the important issues that are before the subcommittee today, and particularly on the bill, H.R. 191.

I should mention that our association is a large and diverse one. It includes many companies that are in the business of developing and marketing computer software. It includes even more database publishers and other information providers in all types of media who are very dependent on the existence of a robust and competitive market in software, particularly software that is used with data and makes that data available.

And we also include many companies that depend upon the Government as a source of data for their information products and services. They look to Government for the data to which they can add value, they can combine it with other data, reformat it, make it more accessible, and as Professor Chandler said, bring it into the stream of commerce rather than keeping it locked up in a Federal storehouse. This ranges everywhere from legal data to economic data—the census example that Mr. Henry gave, of course, is an excellent example—scientific and technical data as well, through companies such as Mead Data Central, McGraw Hill, Dialog, and others that are familiar to those in this field.

The IIA has had two major policy thrusts since 1968, when it was founded, and this issue really occupies the intersection of those thrusts. We have supported strong copyright protection for intellectual property and for information products and services, and we have also supported very vigorously public access to public information, not only as the raw material for these information products, but also as a cornerstone of our system of open Government.

I should mention that in some ways the information industry is an example of a success story in commercializing Government works, commercializing Government information. At least as a general rule, we're talking about information that is in the public domain that the private sector has invested heavily in, has created—as Mr. Chandler might put it— enhancements, and has developed a market not only here in the United States but throughout the world. The U.S. information industry is thriving in world markets.

Part of the reason for that, I would submit, is the long- standing prohibition on copyright in Federal Government works. This is a cornerstone of the system and one that ought not to be lightly discarded.

So if I can just summarize a few points that I think I would like to lay out here—and of course some of them have already come up in the discussion—first, I would like to leave you with the idea that this is not, from our perspective, contrary to some of the testimony we've heard, a natural or logical or incremental step that the subcommittee is considering.

The fact that patents and copyrights are treated differently for Federal purposes is not a strange anomaly. It is something that is built into our copyright system. This is a Rubicon that the subcommittee is coming up to. If the subcommittee and Congress choose to cross it, it should do so with knowledge of the fact that it is overturning two centuries of copyright policy in this country. It's been embodied in statute for one of those centuries, but even prior to that, I'm not aware that the Federal Government asserted copyright even in the maps, charts, and books, which were the only permitted subject matter of the first Copyright Act in 1790.

The second point I would like to make is that this principle, this prohibition on copyrighting Government works, is a defining principle for our society. It is one principle that differentiates us from less open societies, not only from totalitarian societies, but even from other democratic societies that simply don't have this same tradition of open access to public information.

In other countries, including other democratic countries, government information is viewed as an asset for the government to exploit. It is exploited for profit by the government, it is exploited for revenue, and as a consequence of that, the citizens are excluded from access to that information, favorites are played between different competitors for access to that information, information is sold to the highest bidder, and that's how business is done in those societies.

We don't do business in that way. We have not done business in that way. I would submit—and I'm sure the subcommittee would agree—that we don't want to start doing business in that way, either intentionally or inadvertently.

So my third point is that there ought to be—and I think the subcommittee would properly impose a very heavy burden of persuasion upon those who would cut back on Section 105 of the Copyright Act, and should examine the record very closely to see if this particular remedy is absolutely needed to fix the problems that have been identified.

We have heard some discussion of problems today. Certainly the subcommittee is more familiar with this record than I am, but I would have to say, based on the testimony that I've reviewed from last year and from May of this year, that I don't think that strong showing has been made. I think it's important to remember that many of the examples that are given are not from the area that would be addressed by this legislation or that has been the focus of our discussion today. They fall either in the area of software that is developed solely by Government employees and therefore is in the public domain—and if the Japanese are making more use of that than the Americans are, there is nothing to stop the American companies from exploiting exactly the same opportunities.

And the second situation is where the work is performed by private sector employees under a Government contract. As Ms.

Schrader has pointed out, that is a different situation which is not addressed by the legislation today.

My final point is just to address the argument that is made that software is different from other kinds of Government information, from other kinds of works, it's different from the kinds of material that Congress had in 1895 and in 1909 when it first wrote this prohibition into the books. While software is different, depending on how one defines software, I would submit, Mr. Chairman, that software is not so different as to justify an abandonment of a policy that is now embodied in Section 105.

And one of the key reasons for that, as some of the previous questioning has drawn out, is that software in many cases is the gateway to data. It is sometimes in many forms virtually indistinguishable from the data which it is designed to manipulate. To say that we will permit the Government to copyright and exclude others from federally developed software, but not apply that same principle to databases, is something like saying that we have a treasure house of data, we'll let people freely exploit it, but we will maintain exclusive control over the keys.

Mr. Chairman, I think if that's the effect of too broad an application of this legislation, I think it certainly behooves the subcommittee to do as it is doing and examine very carefully the need for the legislation and the breadth of the proposal that is made.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Metalitz follows:]

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STATEMENT OF STEVEN J. METALITZ
VICE PRESIDENT AND GENERAL COUNSEL
INFORMATION INDUSTRY ASSOCIATION

Hearing on
COPYRIGHT PROTECTION FOR COMPUTER SOFTWARE
TO ENHANCE TECHNOLOGY TRANSFER

before the
SUBCOMMITTEE ON TECHNOLOGY AND COMPETITIVENESS
COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

July 18, 1991

The Information Industry Association (IIA) appreciates the opportunity to provide its perspectives on the issue of copyright protection for computer software developed by the federal government, and on the specific legislation (H.R. 191) now pending before the subcommittee.

IIA commends the subcommittee for its timely examination of these important issues. The hearing charter you have prepared demonstrates that you are asking the right questions. IIA wants to help in coming up with the right answers.

IIA is a trade association representing more than 650 leading companies that pursue business opportunities associated with the creation, distribution, and use of information. We are particularly grateful for the opportunity to testify this morning on an issue that occupies the intersection between two of the paramount public policy thrusts that IIA has followed since its founding in 1968: the need for strong, clear copyright protection to promote the development of innovative information products and services that meet the information needs of the American public; and the right of public access to information developed by the federal government.

IIA has a diverse membership, ranging from small start-up companies to giant multinational corporations. The interests of these companies in the issue before the subcommittee are equally diverse. Some IIA members develop and market computer software of all kinds. Many other members are database and electronic information providers whose markets are highly dependent on the availability and quality of a wide range of software products. Many IIA

members play a key role in disseminating federal government information to broader business and consumer markets. These companies, which create new information products and services by adding value to data obtained from the federal government, depend upon fair and unfettered access to federal government information in order to serve their customers. Finally, many IIA members have extensive commercial dealings with federal agencies, which are an important market for a wide range of private sector information products and services.

Despite the diversity of interests it represents, IIA's perspective on the issue of copyright of federal government software is clear. We view the long-standing prohibition against copyright in federal government works as the cornerstone of both of the two major edifices that have made the U.S. information industry the strongest and most competitive in the world. Both unimpeded public access to government information, and strong intellectual property protection for private sector information products and services, depend upon the preservation and strengthening of this key feature of U.S. law. Any legislative proposals to erode this principle should be accorded the most intensive scrutiny. If, following that examination, Congress concludes that the proponents of change have met the heavy burden of persuasion properly imposed on them, any authorization of federal government copyright in its works should be narrowly drafted to preserve the crucial benefits of the general prohibition to the greatest extent possible.

Before turning to the policy underlying current law, and why we believe Congress should approach any proposed changes with considerable skepticism, let me make it clear that IIA fully supports the goals of proponents of these changes. Facilitating the efficient transfer of technological developments from federal government labs to the private sector for further development and

commercialization is an important objective, whose significance can only increase as U.S. companies embark on a future of intensified global competition. The encouragement of cooperative research and development endeavors among federal, state, academic, and industrial researchers is a valuable component of the response to this challenge. Indeed, the information industry has been highly successful in developing innovative, useful products and services, based upon govenrment data in the public domain. These products deliver real value to American businesses and consumers, and have thrived in a competitive global marketplace. Our concerns, simply, are that the right means must be employed to advance the technology transfer goals; our warning is simply that if the wrong means is chosen, it could have a serious detrimental, though unintended, effect on fundamental values of intellectual property protection and open government.

I. THE PROHIBITION ON COPYRIGHT IN GOVERNMENT WORKS IS AN ESSENTIAL ELEMENT OF U.S. INFORMATION POLICY

Some advocates of proposals to allow the federal government to assert copyright in computer software developed by its employees portray this change as a logical continuation of the recent evolution of government patent policy, as an incremental step that follows naturally from legislative changes made in technology transfer policies in the 1980's. If there is one message IIA hopes to send with its testimony today, it is that this description is fundamentally mistaken. There is a Rubicon here, and if Congress chooses to cross it it should do so with full knowledge of the significance of its decision.

The policy at issue is now codified in section 105 of the 1976 Copyright Act, which states that "[c]opyright protection ... is not available for any work of the United States Government ...". 17 USC 105. But its lineage goes back at least a century, and indeed it embodies important values

upon which our nation was founded. The concept that the unrestricted flow of information is essential for our democratic society inheres in the First Amendment's dictate that government may not infringe on free speech. A democratic government must recognize that public access to government information is a right, not a privilege, and that a citizen who obtains such information is entitled to use and disseminate it free of government restrictions or government exactions of royalties.

These bedrock principles of open government are fundamentally at odds with government claims to copyright in government information. Our society, with its unique devotion to free speech, stands nearly alone in this regard. The laws of most other nations permit national governments to exert copyright or similar controls over some or all works authored by their employees. In those countries, information collected from citizens or compiled at taxpayer expense is made selectively available to a favored few, or sold to the highest bidder. In our society, such information is freely available to any citizen on equal terms. This defining difference between open and less open societies is directly implicated by the proposals before the subcommittee today.

As early as 1895, Congress enacted a statute forbidding the federal government to claim copyright in its own works. Since 1909, this prohibition has been codified in the copyright laws. It was reenacted and even strengthened in 1976, when present section 105 was adopted. As the Register of Copyrights told this subcommittee's predecessor last year:

> Section 105 was enacted as part of the Copyright Act of 1976 to give the public unlimited access to important information, to prevent the government from exercising censorship, and to preclude the government from using copyright in government works as a shield that would prevent selected groups from acquiring information.... The theory is that a strong democratic society is a well informed society, and that allowance of government copyright would only restrict free dissemination of valuable government data.

That theory remains as strong and as compelling today as it was last year, last century, and at the time of our nation's founding. Proposals to limit its scope should properly be required to bear a considerable burden of persuasion.

Such proposals are not new.* As long ago as 1961, the Register of Copyrights recommended legislation to allow the government to claim copyright in "special cases where the extraordinary circumstances warrant the departure from the general rule" of prohibition. The proposal ignited an extensive debate that culminated in the Register's decision to drop the recommendation because, in his words:

> [while] there are undoubtedly a few isolated cases in which copyright in a Government work would do no harm and might actually benefit the public... these cases are quite rare.

Nor is it a novel idea that the law should be changed to permit the government to claim copyright in its works in order to facilitate technology transfer. A legislative proposal along this line was made by NASA as early as 1975. During the 1980's, a decade in which technology transfer legislation was almost continually before the Congress and in which at least four major enactments on the subject were made, it was frequently argued that copyright should imitate patent law, in which the government has historically been empowered to exercise exclusive rights over inventions made by its employees within the scope of their employment. Congress was never persuaded to do so.

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* For an excellent survey of the historical background and current debate, see Klipper, "The Copyrightability of Software Created by Federal Employees", Computer Law Association Bulletin, vol. 5, no. 2 (1991), a copy of which has been furnished to the subcommittee.

Indeed, it appears that on only one occasion in the century since the first statutory ban on government copyright was enacted has Congress limited the scope of the prohibition: in 1968, with enactment of the Standard Reference Data Act, 15 USC sec. 290 et seq.

Thus, in order to enact any proposal to allow the federal government to copyright computer software, Congress would have to be persuaded to cross a clear line which it drew a century ago; which it has redrawn in the same place on at least two subsequent occasions; and which it has repeatedly and recently declined to cross when urged to do so for the very reasons which animate the pending proposals. Clearly, given this history, those proposals should be accorded the most intensive scrutiny before they are accepted. The fact that they appear limited to a particular type of copyrighted work -- "computer software" -- does nothing to lighten this burden of persuasion, and indeed could well be viewed as increasing it.

II. THE PRINCIPLES UNDERLYING CURRENT GOVERNMENT COPYRIGHT POLICY ARE FULLY APPLICABLE TO COMPUTER SOFTWARE.

As the subcommittee considers proposals to lift the ban on government copyright with respect to certain "computer software," it should first insist on a clear definition of that term. It then must evaluate arguments that "computer software" should be treated differently from all other types of works of authorship, either because of what "computer software" is, or because of what it is not.

Definitional Issues.

The term "computer software" does not appear in the Copyright Act, so it must be further defined if government agencies are to know exactly what types of works may now be the subject of federal copyright assertions. The Copyright Act does define the term "computer program," as follows: "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result." 17 USC 101. However, clearly most advocates of cutting back on section 105 find this definition insufficiently expansive for their purposes. Rep. Morella's bill, H.R. 191, builds on the Copyright Act definition but adds "any associated documentation, supporting materials, or user instructions." H.R. 191, sec. 2(b). Some agency patent counsel suggested to GAO that the term also embrace "any other data that would enable a computer program to be recreated, reproduced or recompiled." 1990 GAO Report, App. II, at 48. The working definition GAO ultimately used included "related documentation but not separable data bases." Id., at 10 n.2 (emphasis added). (The obvious implication, discussed below, is that some databases cannot be separated from associated computer programs and therefore should be subject to copyright assertions in "computer software.") Some agency officials evidently thought the effort to separate computer programs from databases would be wasted, and forthrightly advocated dismantling of the section 105 prohibition as to the latter as well as the former. Id., at 35. "Several agency officials" took the argument to its logical conclusion and advocated outright repeal of section 105 for all government works. Id., at 36.

Certainly Congress could, if it chose, define a category of works of authorship for exclusion from the reach of section 105. It can make one slice into the ban on federal copyright without giving away the entire salami, as "several agency officials" told the GAO it should do. However, there are inherent difficulties in defining the "computer software" slice, as the preceding definitions may suggest. Perhaps the most critical one is the distinction between a computer program and a computerized database.

In theory, at least, that distinction may be summarized as follows. A computer program, as defined by the Copyright Act, is a "set of statements or instructions" to be implemented by a computer. A database, on the other hand, is the compilation or set of data upon which the computer operates. Some of that data may actually be a part of the computer program itself. Both the computer program and the database may be embodied in a variety of forms, including electronic versions on tape, compact disc, diskette, or some other medium, or hard-wired into the layout of a semiconductor chip. Indeed, both the computer program and the database can be, and commonly are, embodied in the same physical object.

Even this oversimplified summary makes it obvious that it is not always easy to distinguish between a computer program and a database, nor to separate one from the other when an unauthorized reproduction (or other violation of the author's exclusive rights) occurs. To allow the government to assert copyright in computer programs, even with the intent to leave federal government databases in the public domain, raises thorny problems whenever it is difficult to separate the two interlinked works.

That is an increasingly common circumstance, with significant implications for the key principle underlying section 105: public access to government information. Increasingly, government records of all kinds are maintained only in machine-readable formats, consisting of both computer programs and databases. Access to the underlying data is impossible without the ability to use the associated search and retrieval software. Similarly, in expert systems, the knowledge base of data is useless without the ability to manipulate it using the artificial intelligence software with which it is closely linked.

In these and other examples, the ability to assert copyright over the computer program readily translates to the ability to control access to the underlying data. Different formulations of the definition of "computer software" may place the government at different points on the slippery slope leading to copyright of federal databases, but even the narrowest definition could have some detrimental impact on public access to government data, which increasingly is held in electronic formats only. This impact, with its profound consequences both for the private sector information industry and for the general public which depends on its products, is the most significant immediate threat IIA perceives in proposals to allow the government to copyright "computer software."

In this respect, the proposal before the subcommittee typifies a disturbing trend toward increased government control over information. This trend is most pronounced at the state government level, where section 105 does not apply. State and local governments are aggressively asserting copyright over works ranging from computer programs to compilations of state statutes,

with disastrous impacts both on the competitive marketplace and on public access to information. Even at the federal level, the policy principles embodied in section 105 are under attack. For example, the House Merchant Marine Committee recently approved legislation directing the Federal Maritime Commission to charge a copyright-like royalty for on-line access to computerized tariff data, not only by information vendors who obtain this data directly from the agency, but also by subsequent parties in the distribution chain. This proposal, which clearly violates the policy underlying section 105, will have the effect of decreasing public access to the data, and will reduce incentives for the development of improved private sector information products based on the data.

Is "computer software" different?

Whatever their precise definitions of "computer software," most advocates of exempting these works from the ban on government copyright argue that software is different from other works in ways that justify different treatment. Consequently, it is argued, software may be excluded from the reach of section 105 without undermining the integrity of the century-old policy embodied in the statute. These arguments turn either on what "computer software" assertedly is, or else on what it assertedly is not.

Taking the second category of arguments first, it is sometimes argued that "computer software," particularly that developed under cooperative research and development agreements, is not the kind of material Congress had in mind in 1895 or 1909 when it codified the ban on federal government copyright. In that era, it is said, government works were limited to material that more directly implicates First Amendment values and the capability for

self-government, such as the text of statutes and court decisions. The relatively arcane computer programs involved in this debate are quite different, it is argued, and can safely be withdrawn from the public domain without any adverse impact on open government or similar core values.

There are two responses to this argument. First, as noted above, computer software is a gateway to a wide range of government information, which may be accessible only through a computer program. Allowing the government to claim copyright in software will, either immediately or in the near future, threaten full public access to government databases. These databases do, indeed, differ from the material Congress had in mind in 1895 or 1909, but mainly in that they play a more significant role in more aspects of American business and social life than could have been imagined at the turn of the last century. Indeed, every segment of American society now depends on access to information in government databases to pursue a wide variety of public and private goals. The private sector information industry meets this need by adding value to government economic, statistical, scientific, technical, and other databases, and giving customers convenient and timely access to them in useful media and formats. Preserving that access is central, not peripheral, to the policy underlying section 105.

Second, even with regard to a narrowly-defined category of works centered on computer programs, computer software authored by government employees has potentially great economic signficance. While the commercial potential of this software is often cited in support of proposals to cut back on the scope of section 105, in fact it can be viewed as an argument against withdrawing these works from the public domain. The prospect of significant financial gain from licensing its employee-developed software cannot help but

turn the incentive structures of a government agency and its employees away from public purposes and toward whatever activity will produce more revenue. The danger of discriminatory treatment in licensing also grows. The agency may even be tempted to bring its valuable software into the market itself, competing unfairly with private sector firms that do not enjoy taxpayer subsidies. Even if this consequence can be avoided, public access to the work product in question can suffer.

The issue of the government's role in developing computer programs has been in the news lately. Recently, a federal court issued, then vacated, an order denying Ashton-Tate copyright protection in its leading database management software program, dBase, on the grounds that the company failed to disclose that the program is based upon software developed by the federal government. Without getting into the merits of that dispute, it is worth contemplating how different the stakes would be if section 105 did not apply to computer programs and the government had claimed copyright in the purported predecessor to dBase. The issue today is whether part or all of dBase is in the public domain, where software innovators can use it as a platform for further improvements. But if section 105 had not applied, the issue would have been whether mass market database management software would now be controlled by the federal government -- whether a government agency would decide who would be granted or denied access to this useful and widely needed technology. While neither outcome may be desirable, IIA would submit that the latter case is far more troubling than the former.

Finally, some arguments that the nature of computer software renders section 105 inapplicable should be disposed of. The suggestion that the functional or utilitarian aspect of some computer software should justify different treatment under section 105 should be rejected, just as Congress and

the courts have consistently rejected the idea that the functional value of computer programs make them somehow less worthy of copyright protection than other, more traditional works of authorship.

In a related vein, it has been argued that the availability of patent protection for some software-related inventions renders obsolete the distinction between the inventions of federal employees, in which the government can hold a patent, and their development of computer programs, in which section 105 bars government assertions of copyright. The subject of the so-called patent-copyright interface in the field of software is a complex one. For now, it suffices to say that patent protection does not pre-empt copyright protection, nor vice versa. Congress has consistently treated patents differently than copyrights for purposes of federal government claims, despite repeated recent suggestions that the distinctions be erased. Under current law, a federal employee whose software innovation is incorporated in software-related invention may gain access to a royalty stream, while one whose computer program does not satisfy standards of patentability may not. Whether in these cases the two employees are, in fact, similarly situated is far from self-evident. Legislation to equalize their status seems premature at best.

III. ALTERNATIVES TO, AND COMMENTS ON, H.R. 191

Turning to the specific proposal before the subcommittee, IIA offers the following comments concerning H.R. 191.

As discussed above, a considerable burden of persuasion should be imposed upon any proposal to tamper with the long-standing and highly successful policy embodied in section 105. The goal of facilitating technology transfer is an important one, but the subcommittee should seriously

consider whether it may be advanced as effectively without departing from at least a century of consistent policy. In particular, the subcommittee should not approve the legislation without solid evidence of specific technologies that would have been commercialized but for the inability of the federal government to assert copyright in software developed by its employees in the context of a cooperative research and development agreement.

In IIA's view, the public record before the subcommittee thus far does not add up to a compelling case for tampering with section 105. As we discuss in more detail below, H.R. 191 would only apply to part of the spectrum of research and development collaboration between federal and nonfederal researchers. Most of the examples presented to the subcommittee on May 30, and to its predecessor in last year's hearing, are not even drawn from the relevant part of the spectrum. Most of them concern either the use, or misuse, by private sector firms, of computer programs authored wholly by federal employees, and therefore in the public domain; or else problems arising from government demands for copyright control over programs authored wholly by nonfederal researchers under contract to the federal government. Neither of these situations would be reached by H.R. 191, and nothing in the record compellingly shows that either sort of problem would be ameliorated by cutting back on section 105.

To the extent the problem areas identified so far require corrective action, there is no need to amend section 105, and, indeed, perhaps no need for legislation at all. For instance, it has been claimed that some private sector firms have simply "slapped a copyright notice" on federally developed public domain software and aggressively marketed it as their own work. This problem, for which legal remedies already exist, could perhaps be ameliorated by creating a registry for the deposit of software created by federal

researchers. The deposit would establish precisely the level to which the federal researchers had taken the software in question, and would facilitate later determinations of whether a particular private sector software product was, in fact, simply a substantial copy of the public domain software that had been deposited. The registry could itself serve as a useful tool for transfer of software technology to the private sector, by reducing the uncertainties faced by a party seeking to develop and commercialize software of federal origin.

Similarly, when research and development activities are carried out solely by non-federal parties under contract with the federal government, the non-federal researcher is almost invariably the author, and therefore the initial copyright claimant. The controversy in this context is over whether the non-federal party may keep these rights, or must surrender some or all of them to the federal funder of the research. IIA generally supports the consensus that technology transfer in this context is best promoted by rules that leave most of these rights with the non-federal author, and that minimize the government's proprietary claims. (We note that some of the relatively few dissenters from this view may be numbered among the supporters of H.R. 191 and similar proposals.)

Assuming that the subcommittee concludes there has been a compelling demonstration of problems which cannot be addressed by alternative means, IIA urges that careful attention be paid to the following issues with regard to H.R. 191, or any other proposal to cut back on section 105:

(1) Definitional provisions. As discussed above, the works in which copyright may be asserted under H.R. 191 extend beyond "computer programs" as defined in the Copyright Act. Unless compelling evidence is presented of the need for the federal government to exert copyright control over "associated

documentation, supporting materials or user instructions," these elements should be stricken from the definition. Indeed, if possible the definition should be restricted to those specified types of computer programs as to which an adequate record of the need for federal copyright assertions has been made. In any case, federal government databases of any kind, whether or not "separable" from computer programs, must be specifically excluded from the definition of works in which the federal government may claim copyright.

(2) Applicability. The types of collaborative agreements to which H.R. 191 applies should be clarified. GAO's testimony before this subcommittee on May 30 noted that in FY 1989 there were 685 draft and final CRDA's, but over 22,000 "formal arrangements" for collaborative research and development activities between federal laboratories and non-federal partners. It is not clear whether H.R. 191 is restricted to software developed in the context of a CRDA only, or whether its reference to "any other equivalent authority" reaches to these so-called "formal 'non-CRDAs'", which are more than thirty times as numerous. Resolving this ambiguity could mean the difference between a narrow exception and a gaping loophole.

Similarly, the bill should not apply, even within a CRDA, where computer software is developed by federal employees without any contribution of authorship from non-federal parties. There is no uncertainty under current law as to the status of such software: it is in the public domain, and should remain there. The bill seems to reach an opposite conclusion, since it authorizes copyright assertion in software authored wholly by federal employees "in the course of work under" a CRDA.

Even where H.R. 191 would clearly apply -- where the software is developed through the collaborative efforts of federal employees and non-federal parties -- the uncertainties of current law may not be quite as great as some proponents would suggest. For instance, where the resulting work is not, in Copyright Act terms, a "joint work" -- i.e., where the collaborating parties do not intend that their individual contributions "be merged into inseparable or interdependent parts of a unitary whole" -- each party is the author of the distinguishable work he has contributed to the collaboration. The work of the federal author is in the public domain; the non-federal author enjoys copyright in his work. This situation may provide a satisfactory basis for further development by the non-federal collaborator.

(3) Other copyright issues. The core situation reached by H.R. 191 occurs when federal and non-federal parties collaborate on a "joint work," within the meaning of the Copyright Act. Ordinarily either (or any) of the joint authors of the work may unilaterally license rights in the entire work. H.R. 191 would seem to empower the federal government, on behalf of the federal author, to exercise those rights, at least insofar as licensing or assigning the rights to the collaborating non-federal party (while retaining certain rights on the government's behalf). It appears, however, that the government's assertion of copyright is not limited by the legislation to the licensing situation; under the bill, the government "may grant or agree to grant" a license to the non-federal collaborator, but apparently it is not required to do so, and enjoys all the rights of a copyright proprietor in the entire work. In other words, a measure intended to facilitate the exclusive licensing of joint works to the nonfederal collaborator could be used to empower the federal collaborator to exercise full copyright control, clearly an undesirable result.

For this reason, the subcommittee should consider whether the problem targeted by this legislation, if sufficiently serious to justify an amendment to the Copyright Act, could be addressed more narrowly than by an amendment to section 105 and tinkering with the valid policy principles which underlie it. For instance, the subcommittee should explore whether an amendment giving the federal government the power to exclude from the public domain its undivided ownership interest in a joint work, for the sole purpose of transferring that interest to the nonfederal collaborator or other commercializer, would achieve the goal of H.R. 191.

Finally, any legislation that would have the effect of excluding material from the public domain should apply only prospectively, to works authored after its enactment. Conferring copyright protection on existing works that have already entered the public domain raises difficult constitutional questions that should be avoided if possible.

IIA appreciates the opportunity to offer its perspectives on the important issues before the subcommittee this morning. We look forward to assisting subcommittee members and staff in any way possible as the subcommittee considers this legislation.

Mr. THORNTON. We appreciate your testimony. We will hear now from Mr. Togneri.

STATEMENT OF MAURO TOGNERI, VICE CHAIRMAN, INTELLECTUAL PROPERTY COMMITTEE, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, USA, WASHINGTON, D.C.

Mr. TOGNERI. Thank you, Mr. Chairman.

This is my first experience testifying for Congress. I am here wearing two hats, as a representative of the Institute of Electrical and Electronics Engineers, which is a transnational organization with about 320,000 members world- wide, 250,000 in the—and 22,000 of those are in the Federal Government—employed by the Federal Government—and as an—if not a captain—maybe a corporal of industry from a company in North Carolina involved with electronic equipment, computer software, and so forth.

When I started telling my co-workers that I was coming to testify in front of Congress, they wanted to know what I had done.

[Laughter.]

Mr. TOGNERI. And would I be on television.

[Laughter.]

Mr. TOGNERI. It is a pleasure. I am very glad, both as a member of the IEEE and as a member of industry, to be able to at least give you my opinion to something that I think is extremely important to the country.

Since I am last on the list, I will start with a summary. And basically the IEEE is in favor of the bill as it is, with some comments which we've made, which are more of a technical nature than anything else to define some of the pieces of the bill, like software. It's a step in the right direction. We think it's a logical step in a process that started with the Stevenson-Wydler Technology Act.

I also apologize. I'm not used to many acronyms, so if I quote wrong acronyms, please excuse me. In industry, we have a TLA, which is a three-letter acronym, but in Government, they all seem to be four letters.

Mr. THORNTON. There is no suggestion that we're going to copyright Government acronyms.

[Laughter.]

Mr. TOGNERI. So we think that starting with CRADAs is a good start and we're extremely in favor of it. We don't think it needs to be retroactive because that would probably be unfavorable to latecomers in that some parts of industry would have the information already and people that try to exploit the information or the software would find themselves at a disadvantage because they would have to pay royalties.

We feel that also when the copyright prohibition laws were written software didn't really exist and therefore the copyright laws were written. Software now is in copyright. We think it's not necessarily the most ideal way to protect it because it is a different product in that it has attractive commercial implications that some of the other copyright—or most of the copyright products—do not have.

But it does protect it and we feel it's very important that for industry to participate and use what is produced in participation be-

tween Government industry, there has to be protection. We in industry want to add value to things. So we are a value added organization. If there isn't a value to start with, it's very difficult to add to it. And therefore, if we have to invest money into software, the basis of which are not protected, it becomes very difficult to find money.

Now to address one of the other objections that if the Japanese have access to our software, so have we, there is one important difference. The Japanese can get funding for ventures which have lower protection. If our industry goes to the source of capital and says, "I would like to borrow a certain amount of money to develop this idea or this product that comes from the Government," and they say, "Well, how are you sure that someone else is not going to do it," and they say, "Well, I am not because everybody has it, anybody can do it," it's very difficult to start an enterprise on the basis of something that has no protection.

So we feel that this act will remove the roadblock which is now keeping industry from participating more in the Government development. It will also make industry use the Government—the wealth of Government development that exists and that is constantly being developed.

It will also motivate Government workers. We think that for anyone that financial reward is a motivation and we think it is very important for our members, as well as the public at large, that this happen. We, however, would like to see the funding for the compensation coming directly from a royalty, not in the form of a bonus or some other reward which is not tied to the amount of money that is actually coming in because we see this collection of royalty on software that is produced by CRADAs as a way to reduce the cost to the public— especially to the small entrepreneur, to the small company— of access into the intellectual property world.

We also feel that this would produce a level playing field with other countries—with foreign companies— because again it would then allow our company to have the same access to capital support that other countries have. We feel that, however, to address the fact that if the Government is developing a product, that product probably has as a basis a need of the public. So we would not like to see the Government become a software shop for industry.

To that effect, we feel that any software that is developed by the Government should basically be free to individuals for use. Royalties should be charged if in fact that software is going to be commercialized. We think that that charge, then, would actually make the system more equitable because it would put money back into the system helping those individuals, the entrepreneurs, the small companies that don't have the funds to access a system like the patent which is becoming more and more expensive.

On the point of what should be protected, we feel that those things that foster communication—languages, for instance, protocols that deal with communication between computers—all those things that foster development through communication should not be protected. They should be available to anyone.

And so again, thank you very much for allowing me to do this. And I hope I get to do this again.

[Laughter.]

[The prepared statement of Mr. Togneri follows:]

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Promoting Career and Technology Policy Interests of Electrical, Electronics & Computer Engineers

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TESTIMONY

MAURO TOGNERI, VICE CHAIRMAN

INTELLECTUAL PROPERTY COMMITTEE
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
UNITED STATES ACTIVITIES

On

COPYRIGHT PROTECTION FOR COMPUTER SOFTWARE
TO ENHANCE
TECHNOLOGY TRANSFER

Before The

SCIENCE, SPACE, AND TECHNOLOGY SUBCOMMITTEE ON
TECHNOLOGY AND COMPETITIVENESS

July 18, 1991

TESTIMONY

MAURO TOGNERI, VICE CHAIRMAN

INTELLECTUAL PROPERTY COMMITTEE
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.
UNITED STATES ACTIVITIES

ON

COPYRIGHT PROTECTION FOR COMPUTER SOFTWARE
TO ENHANCE
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I am pleased to testify on behalf of the Institute of Electrical and Electronics Engineers - United States Activities' (IEEE-USA) Intellectual Property Committee. The IEEE is a transnational professional technical society whose membership currently includes more than 320,000 electrical, electronics and computer engineers worldwide. The United States Activities unit of IEEE represents 250,000 of these engineers who live and work in the United States.

Our U.S. members believe that the "Stevenson-Wydler Technology Innovation Act of 1980" and the "Federal Technology Transfer Act of 1986" have played an important role in stimulating and increasing the quality of technology in the United States. With advancements in technology, the need for intellectual property protection has become increasingly necessary.

- more -

However, under present law, government agencies working on research and development in cooperation with private industry are only permitted to file for patents -- not copyrights. The "Technology Transfer Improvements Act of 1991" (H.R. 191) would allow Federal agencies to secure copyright rights for computer software, prepared in whole or in part by employees of the United States government, while working under a cooperative research and development agreement (CRDA) with the private sector.

Without such protection foreign nations would benefit from this type of U.S. government software technology, without providing any monetary reimbursement to the United States taxpayers or to Federal employees in the form of an incentive. Nor does it provide any protection to the private sector which paid for the software. In an age of increasing pressure to stabilize taxation and reach a balanced Federal budget, industry has been encouraged to assist in funding joint research and development projects with the Federal government. Without protection of computer software there is less incentive for the private sector to enter into CRDAs and the value of such projects would diminish.

As stated above, our members believe that there is definitely a need for protection for computer software to make CRDAs more attractive to industry. However, at this time, we only recommend protection for computer software generated within the scope of a CRDA.

In response to the five questions of interest found within the Technology and Competitiveness Subcommittee's charter, our members believe that H.R. 191 will not block public access to already existing Federally generated

computer software since the legislation does not appear to be retroactive. Additionally, it would be difficult to bring preexisting software under the CRDA umbrella because, except for undistributed software, it is highly likely that the public has already obtained copies of such software. It would be comparatively disadvantageous to newcomers and would offer a more secure market to those who already have this software in their possession. Further, we believe that the public should have access to any Federally generated software -- even software that possesses a copyright. However, we believe that a fee should only be charged for commercial distribution of the software and databases so that incentives are provided to Federal employees. In addition, payment should be made by those who gain commercial distribution reward from the software and databases. This charge should be used for reimbursing taxes expended to produce the software and database. The individual should be permitted to use software obtained directly from the U.S. government without charge. There should be a minimum fee for an annual payment, so that those who distribute this software, at cost and for the public good, may continue to do so without the burden of royalties. These incentives should stimulate and increase the quality of technology in the United States, as the "Stevenson-Wydler Act of 1980" and the "Federal Technology Act of 1986" have already done.

IEEE-USA, which has over 22,000 Federal employees as members, believes that improvements still need to be made with respect to incentive programs for Federal employees and in the commercialization of Federally generated software. However, we are convinced that the "Technology Transfer Improvements Act of 1991" (H.R. 191) is certainly a step in the right direction.

The bill will enhance U.S. competitiveness and provide rewards to both Federal government inventors and authors of computer software --both of which are priorities of IEEE-USA.

In closing, a concern that IEEE-USA has with respect to H.R. 191, is that the U.S. government should not be permitted to be hired by industry, solely for the purpose of developing software by private industry. We have also included an amendment to identify the specific authors of the computer software so that they would receive appropriate royalties. We have attached these amendments and others to reflect our position and specific technical clarification.

We thank you for the opportunity to share our views on copyright protection for computer software and the "Technology Transfer Improvements Act of 1991" (H.R. 191). I would be happy to answer any questions that you might have.

AMENDMENTS TO THE "TECHNOLOGY TRANSFER IMPROVEMENTS ACT OF 1991"

(H.R. 191)

Line 7 - Delete "author or".

Comment: The reason for deleting the words "author or" is to make sure that the actual authors of the computer software may be identified to the extent they are employees of the United States government for appropriate royalty distribution.

Line 10 - After "agreement", insert "wherein inventions and copyrightable material is contemplated to be developed".

Comment: This amendment is suggested to avoid any criticism that might be levied that there was a potential that the United States government could be hired by industry solely for the purpose of developing software by private industry. This would obviously be contrary to the general premise of the amendment which would be to further the basic research being done by the United States government in conjunction and cooperation with industry. While IEEE-USA supports the proposition that valuable software generated by U.S. employees should also be protected by copyright registration and licensing, IEEE-USA believes that the "Technology Transfer Improvements Act of 1991," is not the appropriate vehicle for implementation of this concept.

Line 9 - After "Government in", insert "contemplation of or in".

Comment: This amendment is suggested because many of the best ideas originate prior to the actual agreement and course of work under a cooperative research and development agreement. In contemplating the project much conceptual work occurs and to preclude the United States government from obtaining copyrights during this period might be contrary to the general thrust of the bill.

Line 17 - After "distribute," insert "use."

Comment: This amendment would serve as further clarification, so that the Government would be able to use the software as well.

Line 17 - After "distribute" and if "use" is amended, add lease, loan, rent,".

Comment: If the amendment above in line 10 is not placed into the final bill, then the words "lease, loan, rent," in this suggested amendment should not be included because the U.S. Government should not contract solely to produce software with the private sector nor should it commercialize said software without further safeguards not contemplated by this bill.

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Line 1 - After "documentation," insert "physical embodiments,".

Comment: This merely expands the definition of computer software.

Mr. THORNTON. Next time we'll try to arrange for the television cameras. I'm sorry.

[Laughter.]

Mr. TOGNERI. Well, really, what I probably need is an excuse slip to tell everybody that I am not in trouble.

[Laughter.]

Mr. THORNTON. Thank you very much for your testimony.

We've been joined by our distinguished colleague from California, Dana Rohrabacher, and I would like to recognize him at this time for any statement he wishes to make and to begin the questioning of this panel.

Mr. ROHRABACHER. Well, first of all I would like to congratulate all of the panelists. I just found your testimony to be concise, and to be on target, and to be understandable, which is—I think the last part is of utmost importance for those of us who don't have the technical background. I feel a lot more educated now than when I walked in the room a half an hour ago.

Because I understand the points you're making, I would just like to focus in on you, because you seem to be taking a different stand than the other members of the panel. And I understand the points that you have made in the panel, and I really want to understand—and I don't fully understand— what I—some of the drawbacks that you see that might happen because of the legislation? I understand the pluses that you're talking about, especially in dealing with foreign corporations' and foreign countries' exploitation of something that we should have property rights to. But what do you see as the drawbacks?

Mr. METALITZ. Well, Mr. Rohrabacher, the main drawback that we see is the danger that allowing the Federal Government to copyright computer software that is developed by its employees will restrict public access to Federal Government databases that are developed in the agencies.

Mr. ROHRABACHER. And what will that mean in terms of - - what are the pluses and benefits of that? What will happen? What is something that is bad that will happen? What is wrong with that?

Mr. METALITZ. More and more Government records now are being kept solely in electronic formats and databases that are accessed by software. You need the software in order to get into the databases. So if by copyrighting the software and restricting access to that—giving one company, for example, exclusive rights there—if that has the effect of cutting off access to databases, it means that the public's access to this information is subject to monopoly control by one company — either by the Federal Government itself, if it chooses to exercise its copyright, or by—

Mr. ROHRABACHER. Maybe you could give me some specific examples of where that might be detrimental.

Mr. METALITZ. Census data might be one example that could be given. As Mr. Henry pointed out earlier, this is data that has enormous significance for many businesses in this country. It is really the basis of a lot of the demographic databases that are used in marketing, in planning throughout the country by State and local governments. There is just a wealth of information there. Most of it is accessible only through some kind of software. There are books

printed that contain census data, but to get to the level of detail that you want and to be able to manipulate the data—

Mr. ROHRABACHER. Shouldn't—but let me toss that back at you. If the taxpayers have put out a considerable amount of money to take the census—and by the way, there is some area of intellectual disagreement on whether or not the Government should be taking the census at all. Maybe we should leave that to private businesses to do for themselves. I might even be in that school of thought.

But if the Government does pay for it—

Mr. HENRY. The gentleman is aware that it's a constitutional requirement.

Mr. ROHRABACHER. I'm certainly not opposed to amending the constitution to make our Government more efficient if these things can be run more efficiently by private business.

But beyond that argument, what is wrong with the Government copyrighting that information and charging a corporation that wants to use that information for using it?

Mr. METALITZ. As was just pointed out, there is a constitutional requirement to enumerate the population and to conduct the census. Historically, this information has been available to the public. For example, if the Government were to copyright this information, one of its prime uses, to put it in a timely context, is for redistricting and reapportionment. I think there is a certain assurance that if the data is in the public domain it will be equally available to all the interested parties in that process. If the data is not in the public domain, if the Government is able to dictate who can get it and who can't get it, there is certainly always the danger of playing favorites or discriminating between potential recipients of that data.

Mr. ROHRABACHER. But in terms of that data, if the Government puts out a considerable amount of money, what is wrong with selling it—perhaps not on a exclusive basis— but in selling that to several different companies who want to use it and helping use that money, those resources, in order to bring down the cost that the Government has to put out in order to get the data in the first place?

Mr. METALITZ. The Government does sell that data today to companies on a non-exclusive basis and the price varies based on the format, based on the degree of detail in the data, and there are issues about how that pricing ought to be set. But the dividing line here is between the Government asserting a copyright, and therefore being able to choose to whom it will sell it, or licensing it exclusively, which is really the approach I think that is contemplated by—

Mr. ROHRABACHER. Could you give me another example, besides the census, where you would see a drawback in this?

Mr. METALITZ. Well, there is also scientific and technical data that the Government develops and that can have a lot of commercial significance. There are businesses that are founded and are thriving on distributing Government legal data. For example, the Lexis system, or the Westlaw system that reports cases in the Federal courts, regulatory information, some congressional hearings are transcribed and sold by information companies, and certainly

everything that goes on within this room is in the public—in the context of this hearing is within the public domain.

Now if the Government were able to assert a copyright over it, that would certainly have detrimental effects as far as public access to that information. Most people can't be here in person, and for whatever reason, despite our colleagues' testimony here, the T.V. cameras have chosen not to be here, so how is that information going to get out?

Well, the Government is going to distribute it when the transcript of this hearing is published and it is distributed in limited copies. I know the copies are extremely limited because your staff had to go to some extra lengths to get us a copy of last year's hearing within the last few days since the stocks have been almost exhausted. But in many cases, private companies are distributing that information, either in raw form or by adding value to it with indexing, abstracting, and other types of enhancements to make it more usable and that get it out to a lot more people than the Government can do on its own.

I think what has happened in the information area with Government data shows that—while I would agree as a general rule that the private sector is not likely to commercialize something in which they don't have an exclusive interest— there are some very important exceptions to that and Government data is because that Government data is in the public domain, it's available to anyone, and yet there is a thriving commercial market for that data.

Mr. ROHRABACHER. And the cost—obviously the Government—I guess what I'm saying is, aren't we saying that the Government could charge a company to do this and that that in some way could compensate the Government for the cost in producing the data in the first place?

Mr. METALITZ. Well, the Government can set prices for the data, more or less independently of whether or not they can copyright that data. They may choose to charge all comers $500, or $100, or whatever, and that's a separate issue on which we have views, but it is not really the issue before this subcommittee.

Mr. ROHRABACHER. I see. Well, thank you very much. I appreciate that, and I do understand the points that you have already made. That's the only reason I'm not questioning you as thoroughly as that witness.

Thank you very much.

Thank you, Mr. Chairman.

Mr. THORNTON. Thank you, Mr. Rohrabacher.

I would like to just inject one question here before recognizing my colleague, Mrs. Morella, and that is— Professor Chandler, once again, I was struck by the example you used to distinguish the reading of a book with the proprietary value that might be involved in the copyrightable software under the provisions of this bill. I wonder if you would elucidate that a bit more.

Dr. CHANDLER. Certainly, Mr. Chairman.

The value of a book is the communication of an idea, and when the reader reads the book the reader apprehends the idea and has now benefitted from the reading of the book as the author intended. I think it was Longfellow that said that every book has an ultimate purpose, which is to inspire. And the communication of the

idea is the—carries the burden of providing the inspiration whereas software provides no inspiration. That is not its objective.

Its objective is strictly utilitarian. It is the ability to store it in a computer and for it to control the operation and functions of a computer so that it is a strictly utilitarian activity. What we did when software came along and we had been introduced to the information age—we created it, as Americans—suddenly we had generated an enterprise, an industry, in which there were billions of dollars in commerce, but there was no legally protectable subject matter.

Private industry was contracting for the sale and purchase of software, but it was not patentable, it was not copyrightable, and after a certain series of Supreme Court decisions, you couldn't even maintain it as a trade secret because it was thought, "Well, it might be patentable subject matter, or it might not be," or "It might be copyrightable subject matter, or it might not be," and that Federal authority preempted States from affording it any protection.

Now the Supreme Court, in the Kiwanee decision, came to the rescue and tried to broaden the basis of proprietary protection by the State. But still, we didn't have a nationwide system and all States didn't have trade secret laws. As a result, software that was privately created lay in the public domain.

President Johnson created a commission in 1964 to study what we should do. I might add, I was a programmer at that time with the Department of Defense. I programmed the very first computers for the Department of Defense when programming was not a profession and when computers were not commonplace. And back in those days we looked at the work of the commission. The Commissioner of Patents decided that software could not be patented. It said it lay in that never-never land somewhere between copyright and patent and that it should be neither. He threw the matter back to the Congress.

When the issue came before the Supreme Court in Gosschalk versus Benson, the Supreme Court said, "No, we shouldn't patent this subject matter. It is not patentable under Section 101 because it contains ideas, it contains an algorithm, it's too much like a law of nature, it's like a formula, it's like mathematics. We cannot patent it. If the Congress wants to patent it, let the Congress define it as patentable subject matter. We'll be happy to uphold it."

Then a new commission was created, the Contu Commission. And Contu looked at it and said, "Well, the decision was made in the 1960s that it's not patentable subject matter, and we've looked at the court decisions on patenting software, they look unfavorable and they opted for copyright." It's a happenstance of history that software is protected by copyright law. It is not the analogy of the subject matter to books that led it to be protected by copyright, it is merely happenstance. And now we cannot rely upon that happenstance as a cause not to protect this commercially valuable subject matter.

We have introduced the world to the computer age. We have provided the world with more software probably in the last 30 years than will be provided to the world in the next 30 years by anyone. We have provided basic computer technology to the world in the

same manner. It has reached a point in the life of the American Nation that we are dealing with more now than the courtesy of letting our neighbors enjoy the fruits of our labor. We're today looking at the survival of our country's economy.

And Congresswoman Morella's bill is designed to reverse that trend and to add some strength, some backbone, with a new — by assertion of intellectual property control over a portion of that new asset. The great asset of this age is intellectual property assets. The greatest asset of the United States is in its intellectual property assets. It is a renewable asset, it is—we're talking here—the Congresswoman's bill is designed to inspire more creativity, which is the creation of more, a larger volume of intellectual assets. And to—we should not, and the Congress should not be inhibited in any way in protecting this intellectual subject matter.

Mr. THORNTON. Let me just reinforce your statement about the happenstance nature of this event by calling to your attention, and then calling for your comments, of the very unusual—and at the time remarkable—case, General Electric against Charbotkee, in which the Supreme Court of the United States determined that the creation of a new form of life was patentable, while at the same time being told that the creation of a software package to produce imagery capability by the Lawrence Livermore Laboratory—which to me seems somewhat less of a small minor adjustment—tinkering with the genome of a bacterium is not much different from tinkering with the plus and minus code of a computer program.

I think that illustrates the happenstance nature of this distinction that you have described.

Dr. CHANDLER. The chairman is absolutely correct. The history of patents is that you—the idea is ultimately articulated in some tangible form. You can finally articulate it.

In fact, if I may take this opportunity to illustrate where we go wrong as a Nation in this field, the industry, the economy—if you're going to produce anything it involves four stages. The first stage is the creative stage where you're dreaming up ideas. And this is the great American way. We train every kid in America to think deeply, to learn to think, to do research, to be brilliant. We don't teach them to work in factories. In fact, I don't know if anyone in the room has a kid that they've trained to grow up and work in a factory. We train our children to grow up and be thinkers, to be creative.

In school—I teach at the university and I teach maybe 300 students a year. The demand upon them—and it starts in the first grade and it doesn't end in the graduate schools— is to be creative, to be original, to generate something new. That's the first stage in the development of any worthwhile thing on earth is the conception of the idea.

The American people are preeminently the strongest in that area. We are the strongest because we have an open and free society. We encourage free debate. We've made these enormous contributions to the world.

The second stage is the conception of a practical use for the idea. And it's the conception of a practical use for the idea—by what I mean articulated in some tangible form— and it's that expression that we will patent. We will not protect anything in that first

stage. It's simply not property in our system. In the second stage, the articulation, the conception of a consumer use for that thing — we call it applied research—that's where we're less strong than, for example, the Japanese or the Germans.

That's because they don't have to devote their resources to the first stage. It's all on a silver platter here. We spend $145 billion a year for it.

The third stage is to manufacture it, and the fourth stage is to deliver it to market and service it. Those are the three stages where our property system protects. Software tends to fall or mimic the first stage. And the Supreme Court is troubled by that. Development of a new form of life articulates something in a tangible form: life. We can see it. We can see it move. We can touch it. You can apprehend it through—

Mr. THORNTON. Through a microscope.

Dr. CHANDLER. Through a microscope.

That's right. Sometimes you take other instruments to perceive it. But the point is that our Supreme Court is conditioned to asking the question, Is it in the second stage, or is it in the first stage? Sometimes—well, let's take a software program, for example. If the software program is a part of an otherwise patentable process, or is stored in a machine where the machine takes on a new form, the court will say that you can get a patent on the software that is loaded in the machine, or you can get a patent on the software as implemented in the process. The problem with that is that anybody can duplicate that. Once they duplicate it, of course, it diminishes the value of the original patent, which has been purchased at a considerable price.

Mr. THORNTON. Thank you. I intended for that to be just a very brief thing, but I really appreciate your response. It was very helpful to the committee.

Mrs. Morella?

Mrs. MORELLA. Thank you very much.

This is has been a wonderful panel and I appreciate—as I know the subcommittee does—your coming here, but also your thought and your preparation for so doing.

Ms. Schrader, I read your comments and I just really want you to feel that we are going to try, by virtue of a vehicle, one that may be in process, to bring the Library of Congress and some other Federal agencies within the Stevenson-Wydler Act. I can appreciate that value, whether this would be the vehicle or something else that we have on its way.

Mr. Togneri, you did a great job of testifying, and you can always tell your colleagues that the television cameras were here and they can keep looking for it, as I do sometimes.

Mr. TOGNERI. On C-Span

Mrs. MORELLA. It is on the cutting room floor.

[Laughter.]

Mrs. MORELLA. And Mr. Metalitz, it was interesting, the discussion on the census, because actually the census would not be part of this particular bill. They are not involved in a CRADA and that sort of thing.

Under the CRADA mechanism, is it not true that all preexisting federally generated software would still be available freely to the public? I wanted to ask you that.

Mr. METALITZ. In software that has been created prior to the—

Mrs. MORELLA. Right.

Mr. METALITZ. I assume that would be the case. I think Mr. Chandler addressed the question of retroactivity. I would agree with him that is probably not wise to attempt to do that.

Mrs. MORELLA. It seems as though the only access that the CRADA would contribute would be the ability to collaborate with a particular software engineer in a Federal laboratory.

Also, when the discussion of money—under a CRADA, no Government money is currently involved, so that the private sector, and not the public sector, are the entities that would be paying for the development of new software that would be developed, right? Do you agree with that? I'm pointing that out in defense of the bill, as it is currently constituted, in terms of allaying some of the concerns that I thought that I had heard.

Mr. METALITZ. Well, as Ms. Schrader pointed out, under the copyright law, the person who pays for it isn't necessarily the person who is going to end up with the copyright under existing law. I certainly don't disagree with what you've—

Mrs. MORELLA. Also, you've alluded a little bit to one of the statistics that Dr. Chandler had used, but when he talked about the fact that as Americans we end up being the ones that continue to pay and other nations are the ones who are profiting, do you not feel that moving in the direction that this bill does would assist us competitively be more efficient?

Mr. METALITZ. Well, I think that that's a very legitimate concern and one that is—obviously should be a paramount concern for this subcommittee.

I think it—I don't know the answer to that question. And it depends on what record is developed before this subcommittee, but in many of the cases that we're talking about, they would not be covered by the legislation and the legislation would have no effect on them. We're talking about the situation, as I understand it, where there is, in effect, a joint work, a work that is jointly authored by Federal employees and private sector employees under a cooperative research and development agreement.

Some of the examples that have been in the record—in previous hearings, anyway—don't fit in that category and therefore this bill would not have an effect on them.

Mrs. MORELLA. Is there any way you would take this piece of legislation and improve it, or do you just feel it's not necessary?

Mr. METALITZ. Our testimony has several—we've outlined several areas where we think the subcommittee ought to take a look at the wording of the legislation, the definition, where it's applicable, and how it relates to the copyright concept of joint work.

The purpose of our testimony is simply to emphasize the significance of the issue that the subcommittee is facing in copyright terms, and the impact that it may have to access— to public access—to Government information. I'm sure everyone would agree that that is an important value that needs to be preserved.

Mrs. MORELLA. We've got great respect for your opinion. We certainly will look into—study it—as we finally vote on it and move the legislation ahead.

Dr. Chandler, if I even had a case to be where I needed representation legally, I would call on you. I think you have not only been so articulate, but very clear in explaining the issues so that your law students obviously gain a great deal. I think it was Lincoln Stefans who once said, "The ultimate value of a book is that it excites one to self-activity." But I will remember what you said about that distinction between software and the value of the book, which is important.

I wondered if your name had been considered for Supreme Court—I'm only kidding.

[Laughter.]

Mrs. MORELLA. But I just wanted to find an excuse to thank all of you for your contributions. We will look at them very closely and appreciate the interest you've shown and the valid ideas that you've projected.

Thank you.

Thank you, Mr. Chandler.

Mr. THORNTON. Thank you very much.

Mr. Henry?

Mr. HENRY. Thank you, Mr. Chairman.

First of all, I want to remind members that we have a 1:00 markup in this subcommittee.

Mr. THORNTON. We have an hour.

[Laughter.]

Mr. HENRY. We're probably going to have to take a break and come back so that if we could meet at 1:00—because I think we'll finish in about 15 minutes—you have to have a forum to go—so let's just keep that in mind as we go on and talk to our colleagues because between now and then I'm sure we're going to have a vote over there.

It strikes me that perhaps part of our problem in this whole thing is that we began our discussion and opening testimony with the use of the word software and that we have this strange word, copyright of computer software, because we don't know what software is, for lack of a better term. That's what makes it so hard to—I'm really on your side, Ms. Schrader.

[Laughter.]

Mr. HENRY. But you gave me a hint as to how we might untangle this, Mr. Chandler. Raw information—since raw information is not patentable—

Dr. CHANDLER. That's right.

Mr. HENRY. So the point is at which point raw information takes on a transformation where it becomes an intellectual asset. Am I right in layman's terms.

Dr. CHANDLER. Yes.

Mr. HENRY. So what we're dealing with is this continuum.

Dr. CHANDLER. That's right.

Mr. HENRY. And for any number of reasons, particularly when we talk about software—forgive me for using the word—the patenting process ceases to be applicable and the copyright process doesn't quite fit.

Dr. CHANDLER. Right.

Mr. HENRY. But we know that we have an intellectual asset.

Dr. CHANDLER. That's correct.

Mr. HENRY. Mrs. Morella and I were talking outside, when we were gone for a little while, in terms of how we might — I think what we need is some clarification here in terms of an intellectual asset test here. It's clearly something that is needed that at which point—what are we dealing with in terms of—we're not trying to breach—pardon me—open up or establish a lack of—we're not trying to break public domain tests.

Dr. CHANDLER. Right.

Mr. HENRY. And that's what Mr. Metalitz is concerned about. You're concerned about it, not as a programmer or programmers, or software companies. You're a merchant. You merchandize data to people who are using it.

By and large, in most cases probably raw data I don't think most of us envision as being under the act. If it's somehow with software, you have areas of gray where you're dealing with information that is not an intellectual asset, even though in many cases a great deal of Government money, public money, may have gone into its gathering—weather data, census data—presumably as an abstract, the field of data, it wouldn't be an intellectual asset. Presumably, I would think that our colleague would maybe get paid for some kind of a duplication cost or something in terms of raw data.

But when you're dealing with software packaging, the nature of the packaging itself invariably involves the development of communication protocols, which are indeed an intellectual asset, and also then are not only communication protocols but manipulative devices. So the raw data is so commingled. My concern is the commingling because it's awfully hard to separate one from the other.

Am I—could you have some kind of intellectual asset test that you're putting here which—we're going to have civil libertarians concerned with this in a completely different thing, not even the commercial side. ACLU types say, "Hey, you're shutting down freedom of information," which isn't really what we're about.

Now, if you want to help me—yes.

Dr. CHANDLER. I think there's a distinction between data and software. Congresswoman Morella's bill adopts the definition of software that is incorporated into the 1976 act. In the administration of that act, over the last 15 or 16 years, the courts have not been too troubled by a confusion between the concept of data and the concept of software. Software has taken on a—has become a term of art in the law. The Congresswoman's bill adopts that term of art. It is in no way to be confused with, for example, the census data, or any other kind of data. It simply is not embraced in the same notion.

Mr. HENRY. But here is where I was going to say where I think we run into the problem again, however. My earlier comments were saying that we have to distinguish between software as data, and software as a tool.

Dr. CHANDLER. Well—

Mr. HENRY. And what I was going to say is that also, however, in some of the kinds of software we're talking about, the data is itself

the tool because it is derived data. It's not raw data, it's derived data.

Mr. METALITZ. Mr. Henry, I think you would also have the situation in practical terms where the product that would be coming from the Government is a package that contains both software and data.

Mr. HENRY. For example, some of the NIST tapes on robotics or, let's say, fire research. In some respects, I'm sure you have insurance companies, in terms of getting free use of this stuff—that's fine, that's what it's for. But the other point would be, as these kinds of research becomes increasingly sophisticated, and is of immense commercial value in and of itself—

Dr. CHANDLER. You mean the data?

Mr. HENRY. The data itself.

Dr. CHANDLER. But isn't that a separate problem?

Mr. HENRY. But it is data which is derived and created, not as raw data, but because of its commercial value.

Dr. CHANDLER. Well, the Copyright Act distinguishes between copyright of data and copyright of software. They're different.

Mr. METALITZ. The Copyright Act provides for copyrighting compilations of data, which is the only one of these subjects that the Supreme Court has really ever addressed , and that was just a few months ago.

Mr. HENRY. But the data I'm talking about in this case, though, is data which is a product of other data. It's not way data.

Mrs. MORELLA. Isn't that currently available?

Mr. HENRY. It is. That's what Mr. Metalitz' concern is. But our concern is that a lot of that is in fact of immense commercial—

Mrs. MORELLA. And it would continue to be available.

Mr. HENRY. No, I'm assuming that at some point it stops on a continuum and we say—for example, on the Livermore— what was the Livermore example that was used?

Mr. THORNTON. It was an imaging device, or an imaging technology, a software.

Dr. CHANDLER. Yes, that was a software program.

Mr. THORNTON. A software program.

Dr. CHANDLER. And what the Japanese did is they simply took the Livermore—they changed the language—they took the Livermore logo off and put their own logo on, and they changed the language from English to Japanese.

Mr. HENRY. There's a crass example. But now let me say, let's take the National Fire Institute there at NIST where in fact what they really have done is not just on that of a tremendous—that has commercial application. That is now raw data. There's just plenty available. It's good for our insurance companies, good for our fire departments, good for our activities in this committee where we deal with the fact that we have the highest fire problem in the world, mainly because we build with wood in open houses—stuff like that—our architectural design. All of us seem to learn from that. But it is really a lot of other things, too. It is no longer data, although it is basically a database.

Mr. METALITZ. Mr. Henry, I think you're absolutely correct that there are many types of Federal Government data which may have commercial significance. The census example is one that we've

been talking about. As Mrs. Morella has pointed out, it is not directly implicated by this bill.

But there could be other types of data that are developed in the context of a cooperative research and development agreement, along with software to manipulate that data, and the challenge is going to be to try to draw that line between the software—the program, I should say, the computer instructions—and the data which the instructions are intended to manipulate.

I think wiser heads than mine have spent quite a bit of time to try to draw a white line there, and I'm not sure they've been successful.

Mrs. MORELLA. I think the CRADA—isn't there already a line drawn within the CRADA?

Mr. METALITZ. Yes, this is assuming that it is within a CRADA.

Mr. HENRY. But my question is whether there is a difference which exists in law which we can find to put in here, Mr. Chairman, between what a lay person would call just raw data out there—that Government collects information— as opposed to data, which is in fact the product of a deliberative research effort. Isn't that part of the database we want to save and put some proprietary protections on it?

Dr. CHANDLER. I would agree that ultimately we should, but I don't think Congresswoman Morella's bill is directed to that subject matter.

Mr. Henry, you correctly identify that there is—that information is on a continuum, and as it moves along that continuum it changes forms, that is, it takes on new characteristics. We learn more about it, we contemplate further uses of it, and it is in fact the contemplation of new use—the conception of new uses—that ultimately might lead to a conception of a patentable design, article, or something of that nature. It may be derived from that same data.

But I think that we think of data which is copyrightable, as distinct from software which is copyrightable, as distinct from software which is used in conjunction with a process which is patentable, or software which is stored in a computer which is patentable. Let me simply say that we have a wide variety of intellectual property assets and it all lies in the public domain.

And when I said earlier that we need to take steps as a Nation to protect it all, that's the direction in which I hope this committee will ultimately go as it looks at technology and competitiveness issues.

This is what President Ross of AT&T said when he said, "We need to reexamine totally our intellectual property laws because the conceptions that we had prior to 40 years ago are frequently no longer applicable today." And the concerns that you have are critical for us to sort out if we are to have a sound structure of law to protect these assets in the decades to come.

Mr. HENRY. What I'm trying to suggest is that in a kind of data that we would all agree would not be something we would seek to protect and take away from public domain, that very conception of new use through software may in fact transform the nature and value of that original body of data in the first place in such a way

that you may have to rethink whether it belongs in the public domain.

Those are—

Mr. THORNTON. I might be able to illicit a response that would help to resolve this very important point. And I illicit it from the predicate that I had sought to gain agreement to expand the language of the Morella bill to include other forms of intellectual property, such as data, because I personally feel that we should be moving along the path that Professor Chandler has indicated.

However, Mrs. Morella has resisted that, and has suggested that her—

Mrs. MORELLA. Gently so.

[Laughter.]

Mr. THORNTON. But has suggested that her approach is a much more limited approach, does not relate to—at this moment in time—to data, but only to computer software, a distinct form of intellectual property, which is further limited—and I have some trouble with this, also—to existing CRADAs.

But Professor Chandler, on viewing this legislation, would you agree that it is very sharply limited and defined to one particular kind of intellectual property, namely the computer software, as distinguished from data, for example?

Dr. CHANDLER. Well, it certainly is, Mr. Chairman. There isn't any question but that Congresswoman Morella has carefully crafted the bill to target only software, as distinct from data, and only CRADA software, as distinct from software generally. And I would certainly agree with the chairman that as a Nation we must move quickly to protect all of it, the data as well as the other software. There isn't any—

Mr. THORNTON. But this bill does not do so?

Dr. CHANDLER. This bill does not do so. But my position is that I have to support a step in the right direction. And this is unquestionably a step in the right direction.

Mr. THORNTON. Speaking of a step in the right direction, all three members of the committee are going to have to start making some steps toward the hall of the House of Representatives in order to vote.

I had deferred my eloquent questioning until the end of this—

[Laughter.]

Mr. THORNTON.—and now find myself faced with the question of just simply saying how much I appreciate each of you for being here. I think you have addressed many important issues that this committee must consider and speaking for the full committee, who will read this report, and for the Congress, we are grateful to you for your input.

This hearing is adjourned.

[Whereupon, at 12:14 p.m., the subcommittee adjourned, to reconvene at the call of the Chair.]

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